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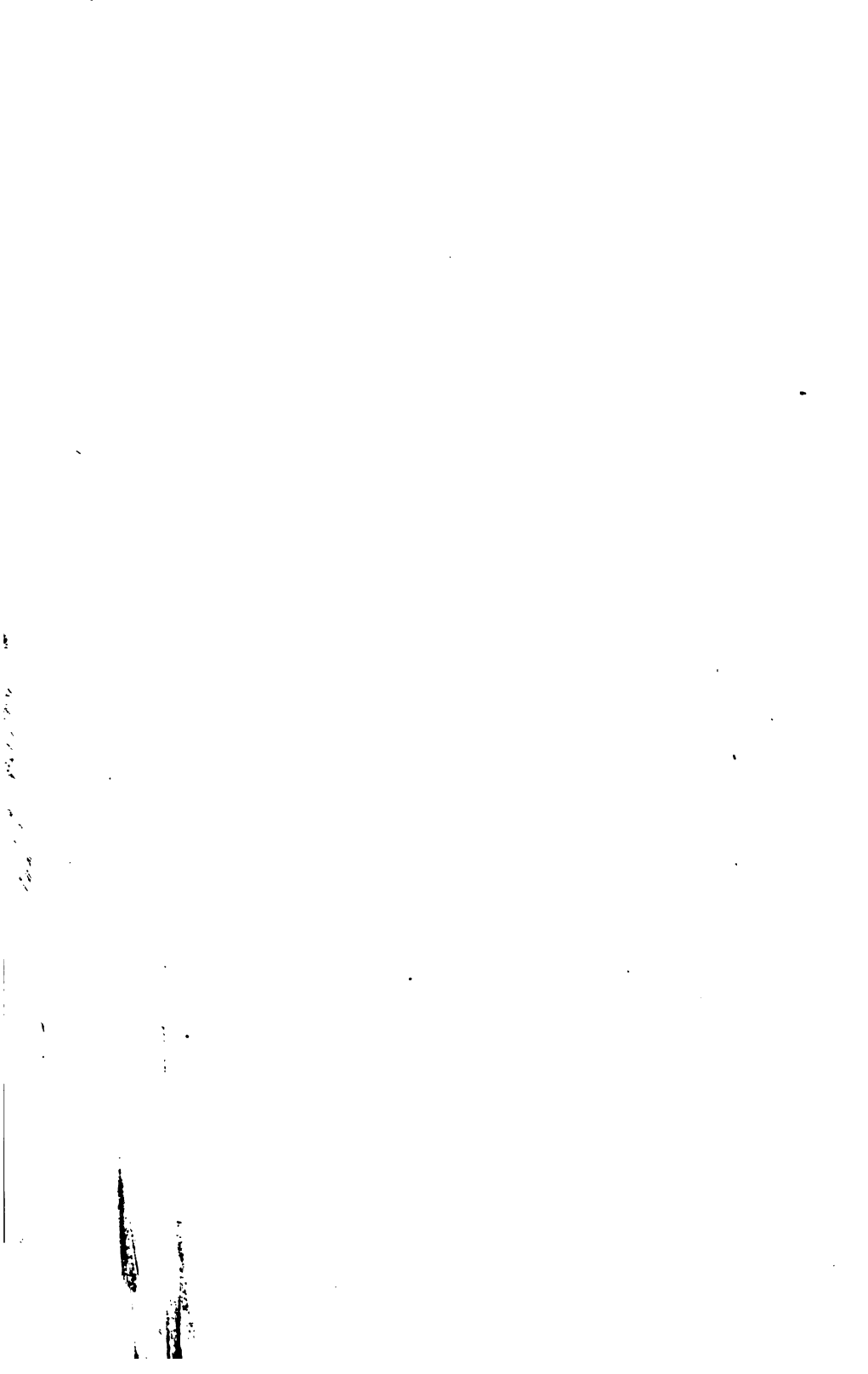
ORNITHOSAURIA, AVES,  
AND  
REPTILIA,  
FROM THE  
SECONDARY STRATA  

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H. G. SEELEY







**INDEX TO THE FOSSIL REMAINS**  
**OF**  
**AVES, ORNITHOSAURIA,**  
**AND**  
**REPTILIA.**



**Cambridge :**

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INDEX TO THE FOSSIL REMAINS  
OF  
AVES, ORNITHOSAURIA,  
AND  
REPTILIA,

FROM THE  
*SECONDARY SYSTEM OF STRATA*

ARRANGED IN THE WOODWARDIAN MUSEUM OF THE  
UNIVERSITY OF CAMBRIDGE.

BY  
HARRY GOVIER SEELEY,  
OF ST JOHN'S COLLEGE, CAMBRIDGE.



WITH A PREFATORY NOTICE BY  
THE REV. ADAM SEDGWICK, LL.D., F.R.S.  
WOODWARDIAN PROFESSOR AND SENIOR FELLOW OF TRINITY COLLEGE.

*Gough Adas Cambridge*  
*J. G. B.*

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## PREFATORY NOTICE.

WITH a strong emotion of pleasure I write these prefatory remarks to accompany the following Catalogue of the Fossil Reptiles in the Woodwardian Museum. It is, I trust, a prelude to other works of a like kind; but it is in itself one of the scientific results of a labour continued through several years by my friend and assistant, H. G. Seeley, Esq. of St John's College. Of the value of his work, the readers of the Catalogue—those especially who read it in our Geological Museum with the arranged specimens before them—will be the best judges; and that it will be of great use to the academic student I cannot for a moment doubt. He may see the specimens one by one, and side by side with the printed lists; and be enabled in that way to comprehend the evidence on which the several arrangements are founded: and, thereby, he may be led to grasp the anatomical reasoning of a more detailed Catalogue, which will I trust soon follow. The great scientific labour bestowed upon this Catalogue has not been at the cost of the University. I wish the cost to be regarded as a contribution of duty from myself, made in the fifty-second year of my public service as a Professor of the University, when from infirmity of sight and feebleness of health I was utterly incapable of undertaking such a task as my friend and assistant has now very nearly accomplished in my behalf.

This thought, among others of a like kind, has enabled me, through three or four past years, to retain with a clear conscience the Geological Chair of the University, though

disqualified by the infirmities of old age for the discharge of some of its laborious and more active duties.

It would be an idle act of folly to put the Cambridge Fossil Reptiles in comparison with the magnificent Reptile series in the British Museum. And there are several provincial and private Collections which contain important Genera of which we have no specimens; and, it may be, which also contain better illustrations, than we are able to exhibit, of certain Genera that do appear in our Catalogues. Still, we have ample, well arranged, and good materials for the use of the academic student; and in the great abnormal and difficult Sub-class of *Ornithosaurians* (or *Pterosaurians*, should that name be preferred) we have a great series of specimens (derived from the, so-called, "Coprolite Diggings" near Cambridge) of perhaps unrivalled interest in the illustration of the osteological structures and true relations of the Sub-class.

While unavoidably absent from Cambridge, and without access to my notes and books of reference, I am unable to give a history of our Reptile collection in any detailed chronological order. What I now write is a mere sketch, which, should it be thought expedient, may be amplified and reduced to a more exact order in the Introduction to future catalogues which are now in progress.

In the year 1819 I procured a few specimens of the Ichthyosaur from the Lias of Somersetshire, which now appear in our arranged collection: and in the year following some additions were made to the Reptiles of the Lias, during an excursion along the coast of Dorsetshire. In several subsequent years valuable specimens were purchased from Mary Anneing of Lyme Regis, a collector of early celebrity. Among them were two very good specimens of the Ichthyosaur; and a very beautiful Pentacrinite, showing the animal structures in great perfection. All these are now mounted in the Museum.

In 1821 our first Plesiosaur was obtained by purchase at an auction of fossils which had been collected by a naturalist of Lichfield. The Genus was at that time so little under-

stood, that the specimen now mounted in our Museum was put up in the same lot with a very fine portion of the head of a small Ichthyosaur; and the two had been catalogued as portions of one animal! In the same year I collected some good reptilian remains and other fossils from the Lias cliffs near Whitby; among which were two jaws and other characteristic bones of the *Teleosaurus Chapmanni*, now mounted in the Museum.

On revisiting the Yorkshire coast, after the lapse of nearly twenty years, I first saw the *Plesiosaurus macropterus*—now the grand ornament of our Museum—which had, with much labour and skill, been dug out of the neighbouring cliffs by some of the well-known jet-collectors of Whitby. It was purchased at the cost of more than £200 by a subscription, generously headed by Dr Clark, at that time our Professor of Anatomy. But the grandest addition to our Reptile series was made a few years afterwards in the form of a munificent gift from T. Hawkins, Esq.—the naturalist and collector, well known by his published works; and who, by his scientific labours and persevering manual skill has so largely helped to adorn the walls of the British Museum.—This noble series of Reptilian fossils (specimens of *Ichthyosaur* and *Plesiosaur* obtained by him from the Lias quarries of Street, Somersetshire) was, I believe, from the first, destined for the Cambridge Museum. It was however made over without any reserve to the late Master of Trinity College (Dr Whewell); and was then, after a short correspondence with Mr Hawkins, transferred to the Cambridge Geological Museum. The mounting of Mr Hawkins' fossil Reptiles was a rather costly operation. The cost was, however, in a good measure met by a surplus left in my hands from the previous subscription for Mr Image's miscellaneous (but chiefly cretaceous) collection; in which was one specimen of an *Ichthyosaur*, now mounted among the Cambridge fossil Reptiles, which very well exhibits the sternal bones of the Genus.

Several good remains of the *Ichthyosaur* and *Plesiosaur* were secured by me during two visits to the Lias quarries of

Barrow-on-the-Soar: and from the same quarries a nearly perfect specimen of an Ichthyosaurus was obtained by Mr Packe, formerly Fellow and Vice-Provost of King's College, and generously presented to the University. From the same locality a fine specimen of *I. tenirostris* was purchased by my late honoured friend, Mr Alsopp (a man of letters, a lover of science, and one of the early reclaimers of Charnwood Forest), and by him given to the University Museum. This valuable specimen, being imbedded in soft crumbling shale, suffered greatly in its transport to Cambridge; and still more from an accident arising out of its incautious mounting for exhibition on the walls of our Museum.

Among our larger illustrative specimens, upon which a considerable cost has been bestowed, we may mention two articulated skeletons of the Plesiosaur derived from the clay-pits near Ely—one presented by Rev. S. Banks, Rector of Cottenham—the other by the late Stead Jones, Esq. of Ely. Both these gentlemen have been zealous benefactors of our Museum.

In this place may be noticed some valuable reptilian remains (including a new Plesiosaur and a new Ichthyosaurus from the Oxford Clay near Peterborough), which I purchased of Dr Henry Porter and presented to the Museum. Also an *os pubis* and a coracoid of an enormous Pliosaurus from the Oxford Clay near St Neots; presented, along with the cervical vertebræ and other valuable organisms, by J. J. Evans, Esq. Lastly, among the Enaliosaurs exhibited in the Museum I may notice a very fine portion of the jaws of the *Ichthyosaurus campylodon*, from the Chalk—purchased of Mr W. Farren by the University, along with his grand series of Ornithosaurian and other remains from the pseudo-coprolite diggings in the Upper Green Sand in the neighbourhood of Cambridge.

Of Palæozoic Reptiles we do not possess one single British specimen. All, or nearly all the fossils, alluded to in this Notice, were obtained from our Secondary or Mesozoic formations: and before I quit the Mesozoic Reptiles which adorn

the walls of our Museum, I must notice the beautiful freshwater Chelonians of the genus *Pleurosternon*, from the Purbeck beds; one of which, perhaps the finest in the series, we owe to the generosity of A. A. Vansittart, Esq. formerly a Fellow of Trinity College.

With the exception of some good fossil Chelonians (which I collected many years since on the Suffolk and Essex coast), we did not, till quite a recent period, possess any good reptilian remains from our Tertiary formations. But since Mr H. Keeping became an Assistant in the Woodwardian Museum, we have—partly through his intervention, partly by his own skilful labour, and partly by diggings conducted under his personal direction, obtained very valuable remains of Mammals, Reptiles, Fishes and Plants from various parts of the Hampshire coast: especially from the celebrated cliff of Hordwell (often noticed in the old Woodwardian Catalogues) and from the rich deposits of Hampstead on the north-west coast of the Isle of Wight.

Along with this remark I may especially notice the Crocodilian and Chelonian remains from the Hordwell cliff, obtained by him during this and the preceding year, with the liberal permission and kind assistance of Colonel Clinton, by help of diggings conducted within the estate. The reptilian remains dug out last year were in multitudinous fragments that seemed to defy any attempt at reconstruction. They were, however, hardened, secured, and put together with such hopeful and patient skill by Mr Keeping, that they at length found a place among the goodly ornaments of our Museum and among its best-defined species: and he is now employed on a like task among the Crocodilian and Chelonian spoils he has gained from the same locality during the present summer.

It is not, however, among the more perfect specimens of the reptilian species—such as have been referred to in the previous notice—that the Cambridge naturalist and comparative anatomist will seek his best materials for study. He will rather dwell upon the great collection of reptilian bones,



fragments of bones, and teeth, in the vertical and table-cases in the S.W. closet of the Museum; and in the vertical cases that form the exterior of the closet. Reptilian remains are there to be seen in thousands; as will appear in Mr Seeley's elaborate catalogues. Among these organisms are some instructive remains of Dinosaurs, Crocodilians, Enaliosaurs, &c. &c. from our older Mesozoic rocks. But, by much the most numerous and instructive specimens are derived from the (so-called) "coprolite diggings" in the *Upper Greensand*, still going on in many open works near Cambridge. This deposit, though very degenerate in thickness, seldom much exceeding a single foot, abounds in organic remains. Several hundred species of Mollusks; fragments of the bones of Reptiles—Dinosaurs, Crocodiles, Enaliosaurs, &c. &c.; countless bones of Chelonians, of many species; countless bones, broken jaws, teeth, vertebræ, &c. of Ornithosaurians (Pterodactyles);—such is the wonderful ancient Fauna of our degenerate Upper Greensand, which lies between our Galt (the well-known brick-earth of Cambridge) and the lower, flintless Chalk. Little would have been known of these fossils but for "the diggings" in search of the phosphatic nodules which are distributed in millions through the formation, along with the organic fossils.

Under the *Galt* is the brown ferruginous sand (sometimes though rarely tinged green by silicate of iron) which holds the water of our *Artesian wells*. It caps the hills at Ely and Haddenham, and may be traced towards the N.E., skirting the dead level of the fens, by Downham; by the sandy hills south of Lynn; and thence along the base of the sandy country that extends toward Hunstanton. In this course it appears to rest chiefly on the Kimeridge Clay; but near the "Upware diggings" it, for a short distance, appears to overlap the Coral Rag.

Towards the S.W. it may be traced, though not at first continuously, breaking out here and there from under the glacial drift. It gradually increases in thickness till it forms a continuous feature in Bedfordshire; and in its course, after

overlapping the Kimeridge Clay finds its base at length upon the Oxford Clay.

All the above deposits of the lower sands were classified by Dr Fitton with his Lower Green or Shanklin Sand. Little was, however, known of the fossils in the Cambridge-shire and Bedfordshire sands at the time when his celebrated Paper was first published.

The economical success of the "diggings" near Cambridge—and of similar works which had been long carried on in Suffolk, among the phosphatized nodules and bones at the base of the Crag—naturally led to further searchings and to new discoveries. Such are the works near Potton, in the ferruginous sands, which are well exposed in the line of the Bedford rail-road: and such also are the *diggings* near Upware, on the banks of the Cam, between Cambridge and Ely. At both these *diggings* the works are still in progress, and have afforded rich spoils to our Museum.

The first fossils from these localities were brought to the Museum by Mr Seeley. Since then Mr H. Keeping has visited the works again and again, and not only bestowed great personal labour upon them, but has obtained by purchase, in behalf of the Museum, from collectors and labourers in the "diggings," a multitude of reptilian remains; which are now arranged in their nearest anatomical relations; are well exhibited; and are described in this Catalogue, after a patient study, by my friend Mr Seeley.

Among these organic spoils are the bones and teeth of the *Iguanodon* and other large *Dinosaurs*, which seem to point to a Wealden fauna for their origin. Are we then to conclude that only the upper part of the Bedfordshire sands is the representative of the Lower Green (or Shanklin) sands of Dr Fitton? and that the middle and lower part (with the Dinosaur remains, &c. &c.) are to be classed with the formations of the Weald or Isle of Purbeck? Or may the organic difficulty be met by the hypothesis that the Dinosaurian bones (undoubtedly much rubbed and rounded) have been drifted out of an older deposit into the middle and

lower portion of the Shanklin sand? If the first and certainly the most direct conclusion be accepted, there must be some break of continuity, or some discordancy of position among the sand-beds which escaped the notice of the early observers. Should no such break of continuity be established, some might still perhaps hold to Dr Fitton's classification.

This Preface may convey some notion of the extent of our collection of reptilian remains: but no idea can be conveyed, by these introductory pages, of the great scientific labour bestowed upon the specimens by the author of the Catalogue. Those only can comprehend the labour and the value of the conclusions derived from it, who have previously studied the details of a very difficult department of Palæontology; and are thereby enabled at once to grasp the evidence on which the several conclusions are founded. With honest expressions of gratulation and good will to the members of the University, and with grateful thanks to the Vice-Chancellor, and the Syndics of the Press, and to the gentlemen who form the Syndicate for the study of Natural Sciences, I here bring my remarks to a close.\*

A. SEDGWICK.

NORWICH, *Aug. 20, 1869.*

\* The commencement of our great series of Ornithosaurian Remains was made by the Rev. H. G. Day, late Fellow of St John's College. He carefully watched the early "coprolite diggings and washing works," near Cambridge; and made a good collection of the organic spoils brought to light by them. Before he left the University he generously transferred his collection to the Woodwardian Museum. In a subsequent note it will, I trust, be my grateful task to give a fuller list of those who have been benefactors to this department of our Museum than I am now capable of doing while absent from the University, and without any books of reference.

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- None.

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## LIAS:

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Plesiosauria, pp. 120—122, 137, 143.

## TRIAS:

? Ornithosauria, p. 133.

Dicynodontia, p. 136.

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## AN APPROXIMATE LIST OF THE SPECIES

included in the following Catalogue, with provisional names\* for new species and reference to the specimens on which they are founded, and to the pages of the Index in which they are described. [Thus *Ptenodactylus Sedgwicki* (Owen) *J. c.* 13. p. 6, signifies that the type-specimen is tablet 13 of compartment c. of cabinet *J*; and is catalogued at p. 6 of this Index.]

FROM THE CHALK. *J. h.* 10.

- 1 ? *Pterodactylus* ? *Cuvieri* (Owen), p. 4.  
Palæontographical volume, 1860; 3rd Supplement to Fossil Reptilia, Pl. 3.
- 2 *Ichthyosaurus campylodon* (Carter), p. 3.  
Owen, Cretaceous Reptiles, Pl. 4; Carter, London Geological Journal, p. 7.
- 3 *Ichthyosaurus angustidens* (Seeley), p. 3.
- 4 *Polyptychodon interruptus* (Owen)†. Index, p. 3.  
Palæontographical Society's volume for 1851; Cretaceous Reptiles, Pl. 11.
- 5 *Chelone Camperi* (Owen), p. 3.  
Owen, Cretaceous Reptiles, Pl. 5.
- 6 *Saurospondylus dissimilis* (Seeley), p. 3; *Annals of Natural History* for September, 1865.
- 7 *Mosasaurus stenodon* (Charlesworth), p. 3.
- 8 *Mosasaurus gracilis* (Owen), p. 3.  
Owen, Cretaceous Reptiles, Pl. 9.

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\* These names are only intended for the convenience of students using the Museum, and not necessarily to take rank as names of described species.

† These references are selected with a view to the wants of students.



## FROM THE CAMBRIDGE UPPER GREENSAND.

## ORNITHOSAURIA.

*Ptenodactylus* (new genus).

- 1 *Ptenodactylus* Sedgwicki (Owen). *J. c.* 13, p. 6.  
Owen, Palæontographical volume, 1859; 1st Supplement to Fossil Reptiles, Pl. 1.
- 2 *Ptenodactylus* Fittoni (Owen). *J. c.* 14, p. 6.  
Owen, 1st Supplement, Pl. 1.
- 3 *Ptenodactylus* Woodwardi (Owen). *J. c.* 18, p. 6.  
Owen, 1860; 3rd Supplement to Fossil Reptiles, Pl. 2.
- 4 *Ptenodactylus* Cuvieri (Bowerbank). *J. c.* 15, p. 6.  
Owen, Palæont. 1851; Fossil Reptiles, Pl. 28.
- 5 *Ptenodactylus* *Oweni* (Seeley). *J. c.* 20, p. 7.
- 6 *Ptenodactylus* *polyodon* (Seeley). *J. c.* 21, p. 7.
- 7 *Ptenodactylus* *microdon* (Seeley). *J. c.* 29, p. 7.
- 8 *Ptenodactylus* *scaphorhynchus* (Seeley). *J. c.* 22, p. 7.
- 9 *Ptenodactylus* *macrorhinus* (Seeley). *J. c.* 31, p. 7.
- 10 *Ptenodactylus* *brachyrhinus* (Seeley). *J. c.* 24, p. 7.
- 11 *Ptenodactylus* *crassidens* (Seeley). *J. c.* 1. 2. 2, p. 8.
- 12 *Ptenodactylus* *dentatus* (Seeley). *J. c.* 1. 9. 1, p. 10.
- 13 *Ptenodactylus* *nasutus* (Seeley). *J. c.* 2. 11. 1, p. 10.
- 14 *Ptenodactylus* *tenuirostris* (Seeley). *J. c.* 2. 12. 1, p. 11.
- 15 *Ptenodactylus* *capito* (Seeley). *J. c.* 3. 14. 1, p. 12.
- 16 *Ptenodactylus* *eurygnathus* (Seeley). *J. c.* 3. 16. 1, p. 12.
- 17 *Ptenodactylus* *machærorhynchus* (Seeley). *J. c.* 6. 33. 1, p. 17.
- 18 *Ptenodactylus* *platystomus* (Seeley). *J. c.* 6. 32. 1, p. 17.
- 19 *Ptenodactylus* *enchorhynchus* (Seeley). *J. c.* 25, p. 7.
- 20 *Ptenodactylus* *colorhinus* (Seeley). *J. c.* 17, p. 6.
- 21 *Ptenodactylus* *oxyrhinus* (Seeley). *J. c.* 2. 13. 1, p. 11.

*Ornithocheirus* (new genus)\*.

- 22 *Ornithocheirus* *simus* (Owen). *J. c.* 16, p. 6.  
Owen, 1860; 3rd Supplement to Fossil Reptiles, Pl. 2.
- 23 *Ornithocheirus* *Carteri* (Seeley)†. *J. c.* 19, p. 6.

\* This genus has no teeth anterior to the palate.

† With two exceptions, all these species are founded on Upper Jaws; to them might be added several others less well defined, and three or four more known to exist in other collections.

- 24 *Ornithocheirus platyrhinus* (Seeley)\*. J. c. 1, p. 10.

## AVES.

*Enaliornis* (new genus).

*Enaliornis Barretti* (Seeley). J. d, p. 7.

Annals of Natural History, August, 1866.

*Enaliornis Sedgwicki* (Seeley), p. 8.

## DINOSAURIA.

*Acanthopholis* (Huxley).

Geol. Magazine, Vol. iv. p. 65, 1867.

- 1 *Acanthopholis platypus* (Seeley). J. c. 23, 24, p. 21.

- 2 *Acanthopholis macrocercus* (Seeley). J. g. VIII.

- 3 *Acanthopholis stereocercus* (Seeley). J. g. VII.

*Macrurosaurus* (new genus).

- 4 ? *Macrurosaurus semnus* (Seeley), p. 45.

## ICHTHYOSAURIA.

- 1 *Ichthyosaurus campylodon* (Carter).

London Geological Journal, p. 7.

- 2 *Ichthyosaurus Walkeri* (Seeley), p. 65.

- 3 *Ichthyosaurus Doughtyi* (Seeley).

- 4 *Ichthyosaurus Bonneyi* (Seeley).

- 5 *Ichthyosaurus platymerus* (Seeley).

## CROCODILIA.

*Crocodylus Cantabrigiensis* (Seeley).

## PLESIOSAURIA.

- 1 *Plesiosaurus planus* (Owen). 90. e, p. 41.

2nd Supplement to Fossil Reptiles, 1864; Palæontographical, Pl. 1—3.

- 2 *Plesiosaurus ichthyospondylus* (Seeley). Case 91. b—g, p. 40.

Syn. Pl. Bernardi (Owen), 1864; not Pl. Bernardi (Owen), 1850.

- 3 *Plesiosaurus cynodeirus* (Seeley). 91. a, p. 41.

- 4 *Plesiosaurus latispinus* (Owen). 90. a, b, p. 40.

2nd Supplement to Fossil Reptilia, 1864, Pl. 7, 8.

\* Since the Catalogue was printed a new species of *Pterodactyle* of this genus has been obtained from the Upper Greensand of the Isle of Wight.

- 5 *Plesiosaurus microdeirus* (Seeley). 90 . c, p. 40.
  - 6 *Plesiosaurus eurypondylus* (Seeley). 90 . f, p. 41.
  - 7 *Plesiosaurus platydeirus* (Seeley). 90 . g, p. 41.
  - 8 *Plesiosaurus pachyomus* (Owen). ? 93 . a, p. 43.
  - 9 *Plesiosaurus neocomiensis* (Campiche). J. e4 . 6, p. 47.
  - 10 *Plesiosaurus ophiodeirus* (Seeley). 94 . d, p. 44.
  - 11 *Plesiosaurus constrictus* (Owen). 92 . f, p. 42.
- Dixon's Geology of Sussex, Pl. 37.
- 12 *Plesiosaurus pæcilospondylus* (Seeley). J. e5 . 5, p. 48.

*Stereosaurus* (new genus)\*.

- 13 *Stereosaurus platyomus* (Seeley). 93 . b, p. 43.
  - 14 *Stereosaurus cratynotus* (Seeley). 94 . c, p. 44.
  - 15† *Stereosaurus stenomus* (Seeley). 93 . d, p. 43.
  - 16 *Polyptychodon interruptus* (Owen). 95, p. 45.
- Suppl. 3 to Cret. Rept. 1860; Palæont. Pl. 4—6.

CHELONIA.

*Rhinochelys* (new genus).

- 1 *Rhinochelys mastocephalus* (Seeley). J. h . 3, p. 25.
  - 2 *Rhinochelys eurycephalus* (Seeley). h . 4, p. 25.
  - 3 *Rhinochelys pulchriceps* (Owen). h . 5, p. 25.
- Cret. Rept. 1851; Palæont. Pl. 7, fig. 1—3.
- 4 *Rhinochelys stenicephalus* (Seeley). h . 6, p. 25.
  - 5 *Rhinochelys cardiocephalus* (Seeley). h . 12, p. 26.
  - 6 *Rhinochelys sphenicephalus* (Seeley). h . 16, p. 26.
  - 7 *Rhinochelys Dazii* (Seeley). h . 21, p. 26.
  - 8 *Rhinochelys platyrhinus* (Seeley). h . 23, p. 26.
  - 9 *Rhinochelys rheporhinus* (Seeley). h . 25, p. 26.
  - 10 *Rhinochelys graptcephalus* (Seeley). h . 32, p. 26.
  - 11 *Rhinochelys dacognathus* (Seeley). h . 36, p. 26.
  - 12 *Rhinochelys colognathus* (Seeley). h . 39, p. 26.
  - 13 *Rhinochelys dimerognathus* (Seeley). h . 42, p. 26.
  - 14 *Rhinochelys grypus* (Seeley). h . 56, p. 27.
  - 15 *Rhinochelys platycephalus* (Seeley). h . 52, p. 27.

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\* In this genus the limb-bones develope neither heads nor trochanters.

† To these might be added half a dozen others, less satisfactorily indicated.

- 16 *Rhinochelys leptognathus* (Seeley). *h.* 48, p. 27.  
 17 *Emys sphenognathus* (Seeley). *g* 9. 1, p. 36.  
     *Trachydermochelys* (new genus\*).  
 18 *Trachydermochelys phlyctænus* (Seeley). *g* 7. 11, p. 35.  
 19 *Testudo Cantabrigiensis* (Seeley). *g* 4. 17, p. 32.

## FROM THE GALT.

- 1 *Ichthyosaurus*, *sp.* p. 73.  
 2 *Chelone*, *sp.*

## FROM THE WEALDEN.

- 1 *Goniopholis crassidens* (Owen). *J. i.* 8. 9, p. 81.  
     Owen, Brit. Ass. Reports, 1841, p. 69.  
 2 *Iguanodon Mantelli* (v. Meyer), p. 83.  
     Owen, Wealden Rept. 1854; Palæontographical.  
 3 *Iguanodon Phillipsi* (Seeley). *J. i.* 9. 34, p. 82.  
 4 *Suchosaurus cultridens* (Owen). *J. i.* 9. 11, p. 82.  
     Rep. Brit. Ass. 1841, p. 67.  
 5 *Megalosaurus*, *n. sp.* p. 84.  
 6 *Hylæosaurus*, *sp.* p. 85.  
 7 *Ichthyosaurus*, *sp.* p. 83.  
 8 *Plesiosaurus*, *sp.* p. 84.  
 9 *Pleurosternon*, *sp.* p. 83.  
 10 *Platemys*, *sp.* p. 85.  
 11 ? New genus *Chelonian*, *sp.* p. 83.  
 12 *Pterodactylus*, *sp.* p. 84.

## FROM THE PURBECK.

- 1 *Pterodactylus macrurus* (Seeley). 88. *a*, p. 89.  
 2 *Teleosaurus*, *sp.*  
 3 *Macellodus Brodei* (Owen). 88. *b*, p. 88.  
 4 *Pleurosternon Sedgwicki* (Seeley), p. 86.  
 5 *Pleurosternon Vansittarti* (Seeley), p. 86.  
 6 *Pleurosternon Oweni* (Seeley), p. 87.  
 7 *Pleurosternon typocardium* (Seeley), p. 87.

\* Nearly related to *Holochelys*, von Meyer.

## FROM THE POTTON SANDS.

About 18 Species.

- Iguanodon, 2 species. VII.—VIII. p. 78.  
 Megalosaurus, sp. p. 79.  
 Hylæosaurus, sp. p. 78.  
 ? Pelorosaurus, sp. p. 78.  
 (Steneosaurus, or) Dakosaurus, 2 sp. pp. 77, 88.  
 ? Goniopholis, sp. p. 80.  
 Pliosaurus brachyspondylus. VI. b, p. 77.  
 Pliosaurus microdeirus (Seeley). VI. a. 9, p. 76.  
 Plesiosaurus, about 4 or 5 species. V, p. 76.  
 Ichthyosaurus, 4 species. IV. b. c, p. 74.
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## FROM THE PORTLAND.

Pliosaurus, sp. p. 91.

## FROM THE KIMERIDGE CLAY.

*Gigantosaurus* (new genus).

- 1 *Gigantosaurus megalonyx* (Seeley). 84. a, p. 94.
  - 2 *Ichthyosaurus chalarodeirus* (Seeley). 86. a. 12, p. 106.
  - 3 *Ichthyosaurus hygrodeirus* (Seeley). 86. b. 3, p. 106.
  - 4 *Dakosaurus lissocephalus* (Seeley). 82. d, p. 92.
  - 5 *Dakosaurus maximus* (Quenst.). 82. e. 3, p. 93.  
 Der Jura, Pl. 97, fig. 11; J. W. Mason, Quart. Jour. Geol.  
 Soc. Vol. xxv. p. 218.
  - 6 *Plesiosaurus megadeirus* (Seeley). 85. a. &c. p. 97, &c.
  - 7 *Plesiosaurus sterrodeirus* (Seeley). 85. d, p. 98.
  - 8 *Pliosaurus brachyspondylus* (Owen). 84. b. c, p. 102.  
 Brit. Ass. Reports, 1839, p. 78.
  - 9 *Pliosaurus brachydeirus* (Owen). 84. f, p. 104.  
 Brit. Ass. Reports, 1841, p. 64.
- Enaliochelys* (new genus).
- 10 *Enaliochelys Chelonia* (Seeley). 86. f, p. 108.
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## FROM THE CORAL RAG AND AMPHILL CLAY.

Ichthyosaurus, sp. J. b. 2, p. 109.

Dakosaurus, sp.

Pliosaurus, sp.

## FROM THE OXFORD CLAY.

*Cryptosaurus* (new genus).

- 1 *Cryptosaurus eumerus* (Seeley). 82. g, p. 93.
- 2 *Ichthyosaurus megalodeirus* (Seeley)\*. I. II. a. b, p. 110.
- 3 *Ichthyosaurus*, sp. II. c, p. 114.
- 4 *Pliosaurus Evansi* (Seeley). III. a. b. c, p. 116.
- 5 *Pliosaurus pachydeirus* (Seeley). IV. a, p. 118.
- 6 *Plesiosaurus*, sp. III. e, p. 118.
- 7 *Plesiosaurus philarchus* (Seeley). D, lecture-room.
- 8 *Steneosaurus dasycephalus* (Seeley). D, lecture-room.

## FROM THE LOWER OOLITES.

*Pterodactylus*, sp. J. b. 2, p. 119.

? *Cetiosaurus*, sp.

*Plesiosaurus Oxfordiensis* (Phillips, m.s.).

*Plesiosaurus*, sp.

## FROM THE LIAS.

20 Species.

*Ichthyosaurus*, about 9 species. C, lecture-room, p. 138.

*Teleosaurus*, 4 sp. 87 and D, lecture-room.

*Plesiosaurus macropterus* (Seeley). A, lecture-room, p. 137.

Annals and Mag. Nat. Hist. 1865, Vol. xv. p. 49.

*Plesiosaurus eleutheraxion* (Seeley). A, lecture-room, p. 137.

Annals and Mag. Nat. Hist. 1865, Vol. xvi. Pl. 14.

*Plesiosaurus cliduchus* (Seeley). A, lecture-room, p. 137.

Annals and Mag. Nat. Hist. 1865, Vol. xvi. Pl. 15.

\* At p. 114, for *Ichthyosaurus dolichodeirus*, read *Ichthyosaurus megalodeirus*.

- Plesiosaurus dolichodeirus* (Conyb.). Lower room, p. 143.  
 Geol. Trans. Series 2, Vol. I. Pl. 48, 49.  
*Plesiosaurus Hawkinsi* (Owen), p. 143.  
 Geol. Trans. Series 2, Vol. v. pp. 43—45.  
*Plesiosaurus macrocephalus* (Conyb.), p. 143.  
 Geol. Trans. Series 2, Vol. v. Pl. 43, 45.  
*Plesiosaurus megacephalus* (Stutch). E, p. 142.  
 Quart. Jour. Geol. Society, Vol. II. Pl. 18.
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## FROM THE TRIAS.

- Phytosaurus Kaupffii*. E.  
*Dicynodon lacerticeps* (Owen). XII. d, p. 136.  
 Geol. Trans. Series 2, Vol. VII. Pl. 3.  
*Dicynodon testudiceps* (Owen). XII. d, p. 136.  
 Geol. Trans. Series 2, Vol. VII. Pl. 5.  
*Dicynodon strigiceps* (Owen). XII. d, p. 136.  
 Geol. Trans. Series 2, Vol. VII. Pl. 6.  
*Dicynodon Murrayi* (Huxley), p. 136.  
 Quart. Jour. Geol. Soc. 1859, p. 649.  
*Rhynchosaurus articeps* (Owen). XII. d, p. 136.  
*Nothosaurus mirabilis* (Münster). XI. c, p. 136.  
 Von Meyer Saurier des Muschelkalks.  
*Nothosaurus venustus* (Münster). XI. c, p. 134.  
*Nothosaurus giganteus* (H. v. Meyer). XI, p. 134.  
*Placodus gigas* (Ag.). XII. a. b. c, p. 135.  
 Agassiz, Poissons Fossiles.  
*Placodus Andriani* (Ag.). XII. a. b. c, p. 135.  
*Pistosaurus*, sp. p. 135.  
*Conchiosaurus clavatus* (v. Meyer). XI. i, p. 135.  
*Charitosaurus Tschudii* (v. Meyer). XI. i, p. 135.  
*Mystriosaurus*, sp. XI. p. 135.
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## FROM THE SOLENHOFEN SLATE.

- Pterodactylus suevicus* (Quenst.). E, p. 142.  
 Ueber *Pterodactylus suevicus* Tübingen, 1855.  
*Pterodactylus rhamphastinus* (Wagn.). E, p. 142.  
 Abhand. Bayerischen Acad. 1852, Vol. VI. Pl. 5.

- Pterodactylus Münsteri* (Gold.). E, p. 142.  
Abhand. Bayerischen Acad. 1852, Vol. vi. Pl. 6.
- Pterodactylus medius* (Münster). E, p. 142.  
Nova Acta Acad. Nat. Curios. Vol. xv. Pt. i. Pl. 6.
- Rhamphorhynchus longimanus* (Wagn.). E, p. 142.  
Abhand. Bayerischen Acad. 1860, Vol. viii. Pl. 16.
- Rhamphorhynchus longicauda* (v. Meyer). E, p. 142.
- Euristernon Wagleri* (Münster). E, p. 142.
- Pleurosauros Goldfussi* (v. Meyer). E, p. 142.
- Gnathosaurus subulatus* (v. Meyer). E, p. 142.
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**TABLE OF THE LARGER GROUPS OF ANIMALS  
INCLUDED IN THIS CATALOGUE.**

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**ORNITHOSAURIA.**

**AVES.**

**DINOSAURIA.**

**DICYNODONTIA.**

**ICHTHYOSAURIA.**

**CROCODILIA.**

**PLESIOSAURIA.**

**CHELONIA.**

**LACERTILIA.**

**OPHIDIA.**

## TABLE OF SECONDARY STRATA.

<i>South of England Section.</i>	<i>East of England Section.</i>
Upper Chalk.	Upper Chalk.
Lower Chalk.	Lower Chalk.
Chalk Marl.	
Chloritic Marl.	
Upper Greensand.	Hunstanton Red Limestone.
Gault.	Cambridge Upper Greensand.
Lower Greensand.	Gault.
Wealden Series.	
Purbeck Series.	Potton Sands and Wicken Beds.
Portland Series.	
Kimeridge Clay.	Kimeridge Clay.
	Upware Limestone.
Coral Rag Series.	Clay equivalent of Coral Rag.
	Elsworth Rock.
Oxford Clay.	Oxford Clay.
Kelloway Rock.	
Cornbrash.	Cornbrash and Forest Marble.
Forest Marble.	
Bradford Clay.	Bradford Clay.
Great Oolite.	Great Oolite.
Stonesfield Slate.	Collyweston Slate.
Fuller's Earth.	
Inferior Oolite.	
Supra-Lias Sands.	Northampton Sands Series.
Upper Lias Clay.	Lias.
Marlstone.	
Lower Lias.	
Penarth Beds.	
Keuper.	
Dolomitic Conglomerate.	
Bunter.	

## REPTILES FROM THE CHALK.

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[J is the name of the Cabinet; *h* is a compartment of cabinet J; 10 is the tenth drawer of compartment *h*; the specimens are arranged in drawer 10 as numbered.]

Casa.	Comp.	Drawer.	Specimen.	
J	<i>h</i>	10	1—5	teeth of <i>Polyptychodon interruptus</i> (Owen).—Halling and Offham. [Dr Forbes Young Collection.]
			6—8	teeth of <i>Polyptychodon interruptus</i> (Owen). Cherry Hinton.
			9—15	teeth of <i>Ichthyosaurus campylodon</i> (Carter) Cambridge.
			16—20	portions of upper and lower jaws and teeth of <i>Ichthyosaurus</i> .—Near Cambridge.
			21	tooth of <i>Ichthyosaurus angustidens</i> (MS.). Hunstanton.
			22	vertebra of <i>Sauropsondylus dissimilis</i> (Seeley).—Cherry Hinton.
			23	tooth of <i>Mosasaurus</i> .—Norwich.
			24	smaller tooth of <i>Mosasaurus</i> .—Norwich.
			25	post-dorsal vertebra of <i>Mosasaurus</i> . Norwich.
			26	tooth of <i>Mosasaurus gracilis</i> (Owen) Halling. [Dr Forbes Young Collection.]
			27—28	two vertebræ probably of a small <i>Mosasaurus</i> .—Halling. [Dr Forbes Young Collection.]
			29	cast of a tooth of <i>Mosasaurus Maximiliani</i> (Gold).
			30	under side of left humerus of a <i>Chelonian</i> . Kent.
			31	marginal plates of <i>Chelone Camperi</i> ? (Owen).—Burham.

Case.	Comp.	Drawer.	Specimen.	
J	A	10	32	marginal plate of Chelone. [Dr Forbes Young Collection.]
			33—34	costal plates Chelone.—Burham.
			35—37	marginal and costal plates Chelone. Burham.
			38	shaft of a bone of Pterodactyle (probably humerus).—Cherry Hinton.
			39	cervical vertebra of a Pterodactyle. Dorking.
			40	proximal end of humerus of Pterodactyle. Lewes.

In the drawers above are placed the basioccipital bone, the atlas and axis anchylosed, the third and fourth cervical vertebræ of an Ichthyosaur, and some of the facial bones from the lower Chalk, over the 'Coprolite' bed of the Upper Greensand, near Cambridge. Also a few teeth in badly preserved fragments of jaws from the lower Chalk of Reach.

The remainder of the Chalk Ichthyosaurs are in a cabinet in the East room (Lecture room.)

## ORNITHOSAURIA

(or Pterodactyles)

### FROM THE CAMBRIDGE UPPER GREENSAND.

Index to the Osteological Collection of Pterodactyle Remains exhibited in the Table-case over Cabinet J.\*

#### *Pectoral and Pelvic girdles and limbs.*

J	a	1	1	fore part of sternum.
	a	2	1—23	coracoid.
	a	3	1—17	scapula.
	a	4	1— 6	distal end of scapula.

\* For descriptions and figures of the bones in this Collection see the Memoir on the Osteology of the Cambridge Pterodactyles.

Case.	Comp.	Tablet.	Specimen.
<b>J</b>	<i>a</i>	5	1—4 proximal end of scapula.
	<i>a</i>	6	1—46 humerus. [No. 2 & 4 presented by C. J. Parker, Esq. No. 5 presented by C. S. Perceval, Esq. No. 35 presented by Rev. G. H. Day.]
	<i>a</i>	7	1—3 proximal end of humerus.
	<i>a</i>	8	1 portion of shaft probably of a large humerus.
	<i>a</i>	9	1—6 ? proximal end of ulna.
	<i>a</i>	10	1—10 distal end of ulna.
	<i>a</i>	11	1—7 ? proximal end of radius.
	<i>a</i>	12	1—4 distal end of radius.
	<i>a</i>	13	5—6 another form of distal end of radius.
	<i>a</i>	14	1—2 undetermined fragments. [? pterygoid end of palatine bone].
	<i>a</i>	15	1—2 epiphyses, apparently proximal of tibia.
	<i>a</i>	16	1—2 fragments in shape like furculum, but probably scapulæ.
	<i>a</i>	17	1 fragment probably of a distal carpal; resembling the long bone of the tarsus in Pterodactylia with the tarsus composita.
	<i>a</i>	18	1 fragment probably of a scapula.
<b>J</b>	<i>b</i>	1	1—13 proximal carpal [No. 7 pres. by Rev. T. G. Bonney.]
	<i>b</i>	2	1—18 distal carpal, with casts from proximal end of wing-metacarpal bone and from distal end of proximal carpal.
	<i>b</i>	3	1—8 distal carpal [No. 5—8 distal carpal presented by Rev. T. G. Bonney.]
	<i>b</i>	4	1—10 lateral carpal [2 & 9 presented by Rev. T. G. Bonney.]
	<i>b</i>	5	1—31 wing metacarpal bone.
	<i>b</i>	6	1—11 first phalange of wing finger.
	<i>b</i>	7	1—15 second phalange of wing finger.
	<i>b</i>	8	1—7 distal end of metacarpal or metatarsal bones.
	<i>b</i>	9	1—4 claw-phalange.
	<i>b</i>	10	1—9 os innominatum.
	<i>b</i>	11	1—26 femur.
	<i>b</i>	12	1—11 ? tibia.

Case.	Comp.	Tablet.	Specimen.	
<b>J</b>	<b>b</b>	<b>13</b>	<b>1</b>	distal end of left tarsus.
<i>Vertebral column and head.</i>				
<b>J</b>	<i>c</i>	1	1—15	atlas and axis [No. 15 presented by Rev. T. G. Bonney].
	<i>c</i>	2	1—41	cervical vertebræ.
	<i>c</i>	2	42—43	cervical vertebræ.
	<i>c</i>	3	1—20	pectoral and dorsal vertebræ [No. 19 presented by Rev. T. G. Bonney].
	<i>c</i>	4	1— 7	sacrum. [No. 3 presented by H. C. Raban, Esq.]
	<i>c</i>	5	1—13	caudal vertebræ.
	<i>c</i>	6	1— 4	reputed caudal vertebræ.
	<i>c</i>	7	1	basi-occipital and basi-temporal bones.
	<i>c</i>	8	1— 2	occipital and parietal segments of skull.
	<i>c</i>	9	1— 2	orbito-ethmo-sphenoid and cast of anterior part of brain-cavity.
	<i>c</i>	10	1— 3	? neural arch of sacrum [No. 3 presented by Rev. T. G. Bonney].
	<i>c</i>	11	1— 4	distal end of quadrate bone with quadrato-jugal.
	<i>c</i>	12	1— 6	os articulare and proximal end of lower jaw.
	<i>c</i>	13	1— 2	premaxillary and dentary bones of <i>Pterodactylus Sedgwicki</i> (Owen). Presented by Rev. G. H. Day*.
	<i>c</i>	14	1— 2	premaxillary of <i>Pterodactylus Fittoni</i> (Owen). Presented by Rev. T. G. Bonney.
	<i>c</i>	15	1— 3	premaxillary and dentary bones of <i>Pterodactylus Cuvieri</i> (Bowerbank).
	<i>c</i>	16	1— 3	? premaxillary bones of <i>Pterodactylus sinus</i> (Owen).
	<i>c</i>	17	1— 2	premaxillary bones of <i>Pterodactylus</i> .
	<i>c</i>	18	1— 4	? premaxillary of <i>Pterodactylus Woodwardi</i> (Owen). [No. 4 presented by A. Colvin, Esq.]
	<i>c</i>	19	1— 2	premaxillary of <i>Pterodactylus Carteri</i> (MS.).

\* These animals are distinct from the *Pterodactylus* of Cuvier, and belong to new genera.

Case.	Comp.	Tablet.	Specimen.	
<b>J</b>	<i>c</i>	20	1	premaxillary of <i>Pterodactylus Oweni</i> (MS.).
	<i>c</i>	21	1	premaxillary <i>Pterodactylus Hopkinsi</i> (MS.).
	<i>c</i>	22	1	premaxillary <i>Pterodactylus</i> .
	<i>c</i>	23	1	dentary bone of a <i>Pterodactyle</i> with a single tooth terminating the jaw in front.
	<i>c</i>	24	1	premaxillary.
	<i>c</i>	25	1	premaxillary.
	<i>c</i>	26	1	premaxillary.
	<i>c</i>	27	1—39	teeth.
	<i>c</i>	28	1	a symmetrical bone, either a phalange or a toothless jaw.
	<i>c</i>	29	2	premaxillary pres. by Rev. T. G. Bonney.
	<i>c</i>	30	1	premaxillary pres. by Rev. T. G. Bonney.
	<i>c</i>	31	1	premaxillary.

#### REMAINS OF BIRDS FROM THE CAMBRIDGE GREENSAND.

<b>J</b>	<i>d</i>	1	1—5	fragments of bone apparently metacarpals.
	<i>d</i>	2	1	fragment of a curved bone.
	<i>d</i>	3	1—8	distal end of humerus [No. 8 presented by Rev. T. G. Bonney].
	<i>d</i>	4	1	proximal end of coracoid.
	<i>d</i>	5	1—2	distal end of metacarpal.
	<i>d</i>	6	1—3	proximal end of right femur.
	<i>d</i>	7	1—3	proximal end of femur.
	<i>d</i>	8	1	femur.
	<i>d</i>	9	1—7	distal end of femur [No. 5 presented by Mr R. Farren].
	<i>d</i>	10	1	undetermined.
	<i>d</i>	11	1—2	proximal end of right tibia, without patelloid process.
	<i>d</i>	12	1	proximal end of right tibia, with patelloid process.
	<i>d</i>	13	1	distal end of left tibia.
	<i>d</i>	14	1	distal end of left tarsus.
	<i>d</i>	15	1	distal end of right tarsus.
	<i>d</i>	16	1	distal end of left tarsus.
	<i>d</i>	17	1	sacrum.



Case.	Comp.	Tablet.	Specimen.
J	d	18	1— 4 dorsal vertebrae.
	d	19	1— 2 (if of bird) caudal vertebrae.
	d	20	1 distal end of left tibia.

ORNITHOSAURIA FROM THE CAMBRIDGE UPPER  
GREENSAND TO ILLUSTRATE SPECIES AND  
GENERA.

Index to the associated collections of Pterodactyle remains contained in drawers of compartment C of cabinet J. (Farren Collection.) Each set of bones is presumed to be part of the skeleton of one individual, the remains having been found in the same place and at the same time.

Case.	Comp. & Drawer.	Series.	Tablet.	
J	c 1			Series 1, from Ground's washing, Coldham Common.

c 1	1	1	distal end of ulna.
c 1	1	2	cervical vertebra.
c 1	1	3	caudal vertebra.
c 1	1	4	tooth.
c 1	1	5	proximal end of first phalange.

Series 2, from Shillington.

c 1	2	1	three cervical vertebrae.
c 1	2	2	premaxillary and three teeth.
c 1	2	3	distal carpal.
c 1	2	4	proximal end of first phalange of wing finger.
c 1	2	5	claw phalange.
c 1	2	6	fragment.
c 1	2	7	undetermined. [? pterygoid end of palatine bone.]
c 1	+2	8	fragment.
c 1	+2	9	part of quadrate and quadrato-jugal.
c 1	+2	10	distal carpal.
c 1	+2	11	fragment. [? of ulna.]

† Probably parts of another individual.

## Series 3, from Eversden.

Case.	Comp. & Drawer.	Series.	Tablet.	
<b>J</b>	c 1	3	1	premaxillary.
	c 1	3	2	cervical vertebra.
	c 1	3	3	proximal end of humerus.
	c 1	3	4	distal end of coracoid.
	c 1	3	5	distal carpal.
	c 1	3	6	proximal end of wing metacarpal bone.
	c 1	3	7	two proximal ends of first phalange.

## Series 4, from Barton (reputed associated).

c 1	4	1	proximal end of humerus.
c 1	4	2	proximal end of humerus.
c 1	4	3	proximal end of humerus.
c 1	4	4	wing metacarpal bone.

## Series 5, from Barton.

c 1	5	1	cervical vertebra.
c 1	5	2	distal end of wing metacarpal.
c 1	5	3	fragment of ulna.

## Series 6, from Haslingfield.

c 1	6	1	proximal end of first phalange of wing finger.
c 1	6	2	proximal end of wing metacarpal.

## Series 7, from the Fens.

c 1	7	1	axis
c 1	7	2	cervical vertebra.
c 1	7	3	shaft of coracoid.

## Series 8, from Ashwell.

c 1	8	1	centrum and neural arch of axis.
c 1	8	2	centrum of dorsal vertebra.
c 1	8	3	proximal end of humerus.
c 1	8	4	distal end of humerus.
c 1	8	5	shaft of coracoid.
c 1	8	6	fragment.
c 1	8	7	proximal end of wing metacarpal.

Case.	Comp. & Drawer.	Series.	Tablet.	
J	c 1	8	8	first phalange of wing finger.
	c 1	8	9	second phalange of wing finger.
	c 1	8	10	?fragment of rib.
	c 1	8	11	?proximal end of first phalange.

## Series 9, from Granchester.

c 1	9	1	premaxillary.
c 1	9	2	scapula-arch.
c 1	9	3	shaft of coracoid.
c 1	9	4	proximal end of wing metacarpal bone.
c 1	9	5	proximal end of second phalange of wing finger.

## Series 10, from Coldham's lane.

c 1	10	1	cervical vertebra.
c 1	10	2	cervical vertebra.
c 1	10	3	centrum of dorsal vertebra.

## Portions of jaws.

c 1		1	premaxillary from Bassingbourne.
c 1		1	premaxillary from Coton.
c 1		1	premaxillary from Harlton.
c 1		1	premaxillary from Haslingfield.

## Series 11, from Haslingfield.

c 2	11	1	premaxillary.
c 2	11	2	proximal end of mandible.
c 2	11	3	four cervical vertebrae.
c 2	11	4	sternum.
c 2	11	5	proximal end of humerus.
c 2	†11	6	distal end of humerus.
c 2	11	7	proximal end of coracoid.
c 2	11	8	shaft of coracoid.
c 2	11	9	proximal end of scapula.
c 2	11	10	two distal ends of scapulae.
c 2	11	11	right and left proximal carpals.

† Part of another skeleton.

Case.	Comp. & Drawer.	Series.	Tablet.	
J	c 2	11	12	two distal carpals.
	c 2	11	13	lateral carpal.
	c 2	11	14	fragment.
	c 2	11	15	proximal end of wing-metacarpal.
	c 2	11	16	2 distal ends wing-metacarpal.
	c 2	11	17	2 proximal ends first phalange.
	c 2	11	18	proximal end of second phalange.
	c 2	11	19	claw phalange.
	c 2	11	20	femur.

## Series 12, from Coton.

c 2	12	1	premaxillary bone.
c 2	12	2	five cervical vertebræ.
c 2	12	3	four dorsal vertebræ.
c 2	12	4	caudal vertebræ.
c 2	12	5	two proximal ends of coracoid.
c 2	12	6	distal end of scapula.
c 2	12	7	distal end of radius.
c 2	12	8	right and left proximal carpal.
c 2	12	9	two distal carpal.
c 2	12	10	two distal end of wing-metacarpal.
c 2	12	11	two distal end of first phalange.
c 2	12	12	proximal end of second phalange.
c 2	12	13	distal end of femur.
c 2	+12	14	?shaft of femur.
c 2	+12	15	distal end of femur.
c 2	+12	16	distal end of wing-metacarpal.

## Series 13, from Smith's washing, Coton.

c 2	13	1	premaxillary bones and tooth.
c 2	13	2	dentary bone.
c 2	13	3	cervical vertebræ.
c 2	13	4	two dorsal vertebræ.
c 2	13	5	proximal end of humerus.
c 2	13	6	distal end of ulna.
c 2	+13	7	distal carpal.
c 2	13	8	lateral carpal.

† ! Parts of another skeleton.

Case.	Comp. & Drawer.	Series.	Tablet.	
J	c 2	13	9	metacarpal.
	c 2	13	10	distal end of femur.
	c 2	13	11	proximal end of tibia.

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## Series 14, from Chesterton (by the bridge).

c 3	14	1	premaxillary and tooth.
c 3	14	2	proximal end of humerus.
c 3	14	3	?shaft of scapula.
c 3	14	4	distal carpal.

## Series 15, from the Fens.

c 3	15	1	premaxillary bones.
c 3	15	2	axis vertebra.
c 3	15	3	two cervical vertebrae.
c 3	15	4	centrum of dorsal vertebra.
c 3	15	5	caudal vertebra.
c 3	15	6	distal end of humerus.
c 3	15	7	lateral carpal bone.
c 3	15	8	proximal carpal bone.
c 3	15	9	distal end of ulna.
c 3	15	10	proximal end of first phalange.
c 3	15	11	shaft of a long bone. [?wing metacarpal.]
c 3	15	12	shaft of a long bone.
c 3	15	13	shaft of a long bone.

## Series 16 from Ditton.

c 3	16	1	premaxillary bones.
c 3	16	2	?posterior end of maxillary bones.
c 3	16	3	neural arch of axis vertebra.
c 3	16	4	cervical vertebra.
c 3	16	5	left coracoid.
c 3	16	6	distal end of humerus.
c 3	16	7	distal end of ulna.
c 3	16	8	carpal proximal row.
c 3	16	9	proximal end of wing metacarpal bone.
c 3	16	10	two distal ends of wing metacarpal bones.
c 3	16	11	proximal end of first phalange.
c 3	16	12	first phalange.

Case.	Comp. # Drawer.	Series.	Tablet.	
J	c 3	16	13	proximal end of second phalange.
	c 3	16	14	two fragments.
	c 3	16	15	fragment.
	c 3	16	16	fragment.

## Series 17, from Haslingfield.

c 3	17	1	premaxillary and dentary bones and tooth.
c 3	17	2	three cervical vertebrae.
c 3	17	3	two proximal ends of humeri.
c 3	†17	4	?proximal end of humerus.
c 3	17	5	two proximal carpals.
c 3	17	6	proximal end of wing metacarpal.
c 3	17	7	distal end of first phalange.
c 3	17	8	distal end of right femur.
c 3	17	9	fragment, ?of Pterodactyle.
c 3		1	premaxillary from the Fens.

## Series 18, from Huntingdon Road Washing.

c 4	18	1	dentary bone.
c 4	18	2	five cervical vertebrae.
c 4	18	3	dorsal vertebra.
c 4	18	4	four caudal vertebrae.
c 4	18	5	right coracoid.
c 4	18	6	scapula arch.
c 4	18	7	two distal ends of scapulae.
c 4	18	8	proximal end of humerus.
c 4	18	9	distal end of humerus.
c 4	18	10	distal end of ulna.
c 4	18	11	distal end of radius.
c 4	18	12	two proximal carpals.
c 4	18	13	two distal carpals.
c 4	18	14	two distal ends of wing metacarpal bone.
c 4	†18	15	distal end of wing metacarpal bone.
c 4	18	16	proximal end of first phalange.
c 4	18	17	proximal end of first phalange.
c 4	18	18	distal end of ?first phalange of wing finger.
c 4	18	19	claw-phalange.

† Part of another skeleton.

Comp. &  
Case. Drawer. Series. Tablet.

<b>J</b>	c 4	18	20	proximal end of femur.
	c 4	18	21	two distal ends of femora.
	c 4	18	22	two proximal ends of tibiae.
	c 4	18	23	proximal end of tibia.

Series 19, from Coldham's lane (second washing on the right).

c 4	19	1	two cervical vertebrae.
c 4	19	2	two proximal ends of coracoid.
c 4	19	3	two distal ends of humerus.
c 4	19	4	three distal ends of wing metacarpals.
c 4	19	5	proximal end of second phalange of wing finger.
c 4	19	6	proximal end of first phalange of wing finger.

Series 20, from Coldham's lane (Walton's washing).

c 4	20	1	dorsal vertebra.
c 4	20	2	right ischium.

Series 21.

c 4	21	1	atlas and axis.
c 4	21	2	cervical vertebra.
c 4	21	3	proximal end of humerus.

Series 22, from the Fens.

c 4	22	1	cervical vertebra.
c 4	22	2	proximal end of coracoid.

Series 23, from Shillington.

c 4	23	1	two cervical vertebrae.
c 4	23	2	proximal end of humerus.
c 4	23	3	distal end of humerus.
c 4	23	4	? proximal end of ulna.
c 4	23	5	proximal end of first phalange wing finger.
c 4	23	6	proximal end of phalange wing finger.
c 4	23	7	distal end of femur.

Series 24, from Coldham's lane (Smith's washing).

c 4	24	1	dentary bone.
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Case.	Comp. & Drawer.	Series.	Tablet.	
<b>J</b>	c 4	24	2	atlas and axis.
	c 4	24	3	three cervical vertebræ.
	c 4	24	4	dorsal vertebra.
	c 4	24	5	shaft of coracoid.
	c 4	24	6	proximal end of scapula.
	c 4	24	7	proximal end of humerus.
	c 4	24	8	distal end of humerus.
	c 4	24	9	proximal end of first phalange of wing finger.
	c 4	24	10	distal end of first phalange.
	c 4			articular end of right ramus of mandible.
	c 4			articular end of left ramus of mandible.
				} probably from Coldham's lane.

## Series 25, from Granchester.

c 5	25	1	four cervical vertebræ.
c 5	25	2	caudal vertebra.
c 5	25	3	two shafts of coracoid.
c 5	25	4	proximal end of humerus.
c 5	25	5	two distal ends of ulna.
c 5	25	6	?proximal end of radius.
c 5	25	7	proximal end of tibia.

## Series 26, from Harston.

c 5	26	1	atlas and axis.
c 5	26	2	four cervical vertebræ.
c 5	26	3	two caudal vertebræ.
c 5	26	4	scapula-arch.
c 5	26	5	distal end of scapula.
c 5	26	6	proximal end of wing metacarpal bone.
c 5	26	7	two distal ends of wing metacarpal bones.
c 5	26	8	?shaft of first phalange.
c 5	26	9	second phalange wing finger.

## Series 27, from Barrington.

c 5	27	1	four cervical vertebræ.
c 5	27	2	caudal vertebra.
c 5	27	3	proximal end of humerus.



Case.	Comp. & Drawer.	Series.	Tablet.	
<b>J</b>	c 5	27	4	two proximal carpals.
	c 5	27	5	two distal carpals.
	c 5	27	6	proximal end of wing metacarpal.
	c 5	27	7	distal end of first phalange.
	c 5	27	8	fragment.
	c 5	27	9	distal end of femur.

## Series 28, from Coldham's lane, first washing.

c 5	28	1	premaxillary bones.
c 5	28	2	articular part of right mandible.
c 5	28	3	three cervical vertebræ.
c 5	28	4	shaft of coracoid.
c 5	28	5	proximal end of humerus.
c 5	28	6	distal end of ulna.
c 5	28	7	distal carpal.
c 5	28	8	lateral carpal.
c 5	28	9	two distal ends of wing metacarpal bones.
c 5	28	10	proximal end of first phalange of wing finger.
c 5	28	11	phalange or metacarpal.

## Series 29 from Chesterton.

c 5	29	1	caudal vertebra.
c 5	29	2	proximal end of coracoid.
c 5	29	3	two distal carpals.
c 5	29	4	fragment.
c 5	29	5	fragment of shaft of phalange.

## Series 30 from Chesterton.

c 5	30	1	two cervical vertebræ.
c 5	30	2	distal end of coracoid.
c 5	30	3	proximal carpal.
c 5	30	4	distal carpal.
c 5	30	5	proximal end of second phalange.
c 5	30	6	distal end of femur.

## Series 31, from Harston.

c 6	31	1	atlas and axis.
c 6	31	2	three cervical vertebræ.

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Case.	Comp. & Drawer.	Series.	Tablet.	
J	c 6	31	3	two proximal ends of coracoid.
	c 6	31	4	distal end of radius.
	c 6	31	5	two distal carpals.
	c 6	31	6	distal end of wing metacarpal.
	c 6	31	7	two distal ends of first phalange of wing finger.
	c 6	31	8	proximal end of tibia.
	c 6	31	9	undetermined fragment. [?pterygoid end of palatine bone.]

## Series 32 from Horningsea.

c 6	32	1	premaxillary bones.
c 6	32	2	articular end of left ramus of mandible.
c 6	32	3	three cervical vertebræ.
c 6	32	4	two caudal vertebræ.
c 6	32	5	proximal end of humerus.
c 6	32	6	distal end of humerus.
c 6	32	7	distal end of ulna.
c 6	32	8	two proximal carpals.
c 6	32	9	three distal carpals.
c 6	32	10	? proximal end of wing metacarpal.
c 6	32	11	distal end of wing metacarpal.
c 6	32	12	distal end of femur.
c 6	32	13	shaft of a long bone, [probably femur].
c 6	32	14	proximal end of tibia.

## Series 33 from Ashwell.

c 6	33	1	dentary bone.
c 6	33	2	four cervical vertebræ.
c 6	33	3	dorsal vertebra.
c 6	33	4	sacrum.
c 6	33	5	three caudal vertebræ.
c 6	33	6	shaft of coracoid.
c 6	33	7	proximal end of scapula.
c 6	33	8	shaft of scapula.
c 6	33	9	distal end of humerus.
c 6	33	10	distal end of humerus.
c 6	33	11	distal end of ulna.
c 6	33	12	two proximal carpals.

Case.	Comp. & Drawer.	Series.	Tablet.	
J	c 6	33	13	carpal.
	c 6	33	14	lateral carpal.
	c 6	33	15	distal end of wing metacarpal bone.
	c 6	33	16	proximal end of second phalange.
	c 6	33	17	undetermined.
	c 6	33	18	os innominatum.
	c 6	33	19	proximal end of femur.
	c 6	*33	20	shaft of femur.
	c 6	33	21	proximal end of tibia.
	c 6	*33	22	proximal carpal†.

## DINOSAURIA,

## FROM THE CAMBRIDGE UPPER GREENSAND.

Index to the *Remains of Dinosaurs and Dinosauroid animals*, mounted to illustrate the *Osteology of the Order* as exemplified in the *Cambridge Greensand*.

Exhibited in Compartments d and e, of Table-case J.

Case.	Comp.	Tablet.	Specimen.	
J	2d	1	1	probably a tooth. It no way resembles the teeth figured by Profr. Owen (2nd Supt. to <i>Iguanodon</i> , pl. 7 f. 15—16, f. 17) of which the former as remarked by Professor Leidy nearly resembles <i>Hadrosaurus</i> ( <i>Smithsonian Contributions to Knowledge</i> Vol. xiv. pl. xiii.) while the other is like <i>Iguanodon</i> . It shows no indication of the Dinosaurian lateral serrations, and the crown, if it be a crown, is laterally expanded, and of a compressed trapezoidal form.

\* †Part of another skeleton.

† The fragments rejected from the foregoing associated sets of bones are preserved in the upright Cabinet LXXXIII.

Case. Comp. Tablet. Specimen.

**J 2d** 2 1—4 a cervical, dorsal, early caudal or sacral, and late caudal vertebræ reputed associated. No. 1, posterior cervical, shows the two tubercles for the rib, one on the side of the centrum in front, and the other given off from under the prozygapophysis which does not extend in front of the centrum. The intervertebral surfaces are flattened and slightly concave; between them the centrum is much compressed towards the base.

**2d** 3 1—7 an associated series of posterior dorsal vertebræ from Burwell presented by C. M. Doughty Esq. The centrum is rounded on the under side.

**2d** 4 1—10 dorsal vertebræ. No. 1 is early dorsal and has the neural arch preserved; it shows the lateral platform at the base of the neural spine; from the middle of the under-side of the platform is given off the process which supports the rib. The centrum is laterally compressed and forms a sharp ridge on the visceral aspect.

**2d** 5 1—5 early caudal vertebræ. Large bones with the centrum oblique in side outline, the posterior intervertebral surface being much larger than that in front, to give attachment at its inferior margin to the chevron bone. The centrum is rather short from front to back, and at its junction with the neural arch gives off a strong transverse process. The neural arch is small.

**2d** 6 1—7 posterior caudal vertebræ. The centrum is more elongated than in early caudal vertebræ; ridges are developed on the sides and under surface of the centrum. The chevron bones still continue, the facets at the back of the centrum being close

Case. Comp. Tablet. Specimen.

- together. The neural arch is small and very much depressed.
- J 2d 7 1—4 caudal vertebræ anchylosed, with chevron bones and neural arches preserved.
- 2d 8 1—4 sacral vertebræ probably Dinosaurian; both neural arches and transverse processes are wanting.
- de 9 1—8 caudal vertebræ, centrum depressed and slightly oblique, flattened or cupped in front, ball behind; neural arch on its anterior half; zygapophyses long, no chevron bones.
- 2d 10 1—5 dermal armour of a dinosaur. 1, 2, and 3 show the under sides of plates; 4 and 5 the outsides. 1 and 2 show the scars of the muscles to which the plates were attached. The plates all have an elevated crest, sometimes as in 5 produced into a spine.
- e 1 1—2 a very large rib imperfect at both ends; characters chiefly crocodilian. A small rib with two tubercles at the proximal end.
- e 2 1 tibia\*  $5\frac{1}{2}$  inches long. Slender in the shaft, curved and compressed. Testudinarian in character, distal end well preserved.
- e 3 1 tibia\* of an animal nearly allied to the last: the bone is  $8\frac{1}{2}$  inches long, and worn at the proximal end.
- e 4 1 ulna\* straighter in its outlines and more massive than the ? tibia, 6 inches long, proximal end worn. Distal end relatively large.
- e 5 1 ulna\* similar to last, showing form of proximal end. It is  $8\frac{1}{2}$  inches long.
- e 6 1 middle metatarsal bone  $7\frac{1}{2}$  inches long.
- e 7 1—4 three phalanges and a claw-phalange associated.
- e 8 1—5 three metacarpal bones, a phalange and an elongated claw-phalange associated.

\* On the hypothesis of Chelonian affinities predominating in the animal. If the affinities were chiefly Crocodilian, then the supposed tibia would be an ulna.

Case. Comp. Tablet. Specimen.

- J** *e* 9 1—5 middle phalanges.
- e* 10 1 cast of a first phalange.
- e* 11 1 a middle metatarsal bone.
- e* 12 1—4 various phalange bones.
- e* 13 1—3 tarsal bones.
- e* 14 1—6 undetermined bones, having much the form of teeth, but probably dermal armour.
- e* 15 1 metatarsal of first digit.
- e* 16 1—4 three tarsal bones and a cast of No. 3. This bone presented with others by C. Spencer Percival, Esq.
- e* 17 1 proximal end of metatarsal.
- e* 18 1 undetermined.
- e* 19 1 proximal end of ulna.
- e* 20 1—2 claw-phalanges; one compressed from side to side, the other compressed from above downward.
- e* 21 1 ? fragment of distal end of tibia.
- e* 22 1—13 associated bones of a foot from Haslingfield, comprising 6 fragments of metatarsals, 6 phalanges, and a claw-phalange.
- e* 23 1—6 a phalange, and the five metatarsals found associated. The longest (3rd) measures 6 inches, together they measure over the proximal ends nearly 11 inches. The first four are sub-crocodilian, the fifth is sub-lacertian.
- e* 24 1—7 six caudal vertebræ and a chevron bone, found associated with *e* 23, from Bottisham.
- e* 25 1 first metatarsal bone.
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ASSOCIATED REMAINS OF DINOSAURS,  
FROM THE CAMBRIDGE UPPER GREENSAND.

Arranged to illustrate Species and Genera. Each Series of bones is presumed to be part of the skeleton of one individual, the remains having been found in one place and at the same time.

Exhibited in compartments **f** and **g** of table-case **J**.

Series I.\* 28 Specimens.

Case. Comp. Tablet. Specimen.

<b>J</b>	<i>f</i>	1	1—3	three dorsal vertebræ.
	<i>f</i>	2	1—2	two halves of dorsal vertebræ.
	<i>f</i>	3	1—4	early caudal vertebræ.
	<i>f</i>	4	1—3	late caudal vertebræ.
	<i>f</i>	5	1	dorsal vertebra.
	<i>f</i>	6	1	? transverse process.
	<i>f</i>	7	1	proximal end of a middle metatarsal bone.
	<i>f</i>	8	1	distal end of a metatarsal bone.
	<i>f</i>	9	1	proximal end of 1st ? metatarsal bone.
	<i>f</i>	10	1	claw-phalange of depressed type.
	<i>f</i>	11	1—2	phalanges.
	<i>f</i>	12	1	undetermined fragment, probably metatarsal.
	<i>f</i>	13	1—2	dermal plates.
	<i>f</i>	14	1—2	dermal plates.
	<i>f</i>	15	1—3	dermal plates.

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\* On the Tablets the number of the Series is placed after the Compartment letter and before the Tablet number. Thus, in the eighth Series,  $\frac{g \cdot \text{VIII} \cdot 1}{J}$ .

## Series II. 36 Specimens.

Case. Comp. Tablet. Specimen.

<b>J</b>	<i>f</i>	1	1—3	dorsal vertebræ.
		2	1	dorsal vertebra.
		3	1	dorsal vertebra.
		4	1—4	early caudal vertebræ.
		5	1	early caudal vertebra (reputed associated).
		6	1—2	chevron bones.
		7	1	terminal caudal vertebra.
		8	1	proximal end of metatarsal bone.
		9	1	rib; proximal end, single head.
		10	1	fragment of a symmetrical bone.
		11	1	phalange.
		12	1	claw phalange.
		13	1	undetermined fragment.
		14	1	fragment of ilium.
		15	1—3	? fragments, transverse processes.
		16	1—3	dermal plates.
		17	1—2	dermal plates.
		18	1—3	dermal plates.
		19	1—3	dermal plates.
		20	1—2	dermal plates: in this species they are nearly smooth.

## Series III. 11 Specimens, reputed associated with Series II.

<i>f</i>	1	1	fragment of jaw showing grooves for 8 teeth.
	2	1	distal end of metacarpal bone.
	3	1	phalange.
	4	1	proximal end of phalange.
	5	1	undetermined fragment.
	6	1	?chevron bones.
	7	1	undetermined fragment.
	8	1—4	terminal caudal vertebræ.

## Series IV. 9 Specimens, presented by C. M. Doughty, Esq.

<i>f</i>	1	1—3	dermal plates.
	2	1—3	dermal plates.
	3	1—3	dermal plates.



## Series V. 5 Specimens.

Case. Comp. Tablet. Specimen.

**J** *g* 1 1—5 two posterior dorsal and three caudal vertebræ.

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## Series VI. 6 Specimens.

*g* 1 1—6 caudal vertebræ.

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## Series VII. 12 Specimens.

*g* 1 1—12 1—2 dorsal; 3—4 post dorsal; 5—11 caudal;  
12 dermal bone.

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## Series VIII. 40 Specimens.

*g* 1 1—17 1 cervical vertebra; 2—5 early dorsal vertebræ; 7—10 dorsal; 11—12 parts of sacrum, including remains of four vertebræ; 13—17 early caudal vertebræ.

- |    |    |   |
|----|----|---|
| 2  | 1  | ? distal end of tibia.                  |
| 3  | 1  | proximal end of metatarsal.             |
| 4  | 1  | proximal end of metatarsal.             |
| 5  | 1  | proximal end of metatarsal.             |
| 6  | 1  | 1st metatarsal.                         |
| 7  | 1  | large phalange.                         |
| 8  | 1  | small phalange.                         |
| 9  | 1  | undetermined.                           |
| 10 | 2  | right and left ? distal ends of humeri. |
| 11 | 1  | undetermined.                           |
| 12 | 1  | undetermined.                           |
| 13 | 11 | dermal armour.                          |
-

## CHELONIA,

FROM THE CAMBRIDGE UPPER GREENSAND.

Index to the bones of Chelonians, from the Cambridge Greensand, mounted to exemplify the Osteology of the Order. Exhibited in Compartments *h*, *i*, *j*, of Table-case *J*.

The majority of the skulls belong to a new genus which may be called RHINOCHELYS, having for its type *Chelone pulchriceps* (Owen). It is Emydian in its affinities, and well characterized by having the nasal and pre-frontal bones distinct; by the posterior nares being formed by the maxillary and palatine bones, and divided by the whole length of the vomer which extends on the palate between the palatine and premaxillary bones; and by the temporal region being covered by an arrangement of bones like that in *Chelone*.

Case. Comp. Tablet. Specimen.

<b>J</b>	<i>h</i>	1	1	worn skull of <i>Rhinochelys</i> .
	<i>h</i>	2	2	anterior region of skull, <i>Rhinochelys</i> .
	<i>h</i>	3	1	skull of <i>Rhinochelys</i> (type for a species).
	<i>h</i>	4	1	skull of <i>Rhinochelys</i> (type for a species).
	<i>h</i>	5	1	skull of <i>Rhinochelys pulchriceps</i> (Owen, sp.).
	<i>h</i>	6	1	skull and lower jaw of <i>Rhinochelys</i> (type for a species).
	<i>h</i>	7	1	hinder region of skull of <i>Rhinochelys</i> .
	<i>h</i>	8	1	left anterior region of skull of <i>Rhinochelys</i> .

Cass.	Comp.	Tablet.	Specimen.
<b>J</b>	<i>h</i>	9	1 worn upper part of skull of Rhinochelys.
	<i>h</i>	10	1 anterior palatal region of skull of Rhinochelys.
	<i>h</i>	11	1 anterior region of skull of a large Rhinochelys (distinct species).
	<i>h</i>	12	1 small skull of Rhinochelys (type for a species).
	<i>h</i>	13	1 skull of Rhinochelys.
	<i>h</i>	14	1 skull of Rhinochelys.
	<i>h</i>	15	1 skull of Rhinochelys (type for a species).
	<i>h</i>	16	1 skull of Rhinochelys (type for a species).
	<i>h</i>	17	1 skull of Rhinochelys.
	<i>h</i>	18	1 snout of a blunt-nosed Rhinochelys.
	<i>h</i>	19	1 basi-occipital and basi-sphenoid of a large Che- lonian skull.
	<i>h</i>	20	1 skull of Rhinochelys.
	<i>h</i>	21	1 skull and lower jaw of Rhinochelys (type for a species).
	<i>h</i>	22	1 skull of Rhinochelys.
	<i>h</i>	23	1 skull of Rhinochelys.
	<i>h</i>	24	1 skull of Rhinochelys (anterior part).
	<i>h</i>	25	1 anterior region of a large skull of Rhinochelys.
	<i>h</i>	26	1 anterior region of a large skull of Rhinochelys.
	<i>h</i>	27	1 anterior region of skull of Rhinochelys.
	<i>h</i>	28	1 anterior region of skull of Rhinochelys.
	<i>h</i>	29	1 anterior region of skull of Rhinochelys.
	<i>h</i>	30	1 anterior region of skull of Rhinochelys.
	<i>h</i>	31	1 anterior region of skull of Rhinochelys.
	<i>h</i>	32	1 posterior part of a large Emydian skull.
	<i>h</i>	33	1 posterior part of a large Emydian skull.
	<i>h</i>	34	1 posterior part of a smaller Emydian skull.
	<i>h</i>	35 1—4	small mandibles, sharp in front.
	<i>h</i>	36 1, 2	broad mandible, compressed in front, with a mesial ridge.
	<i>h</i>	37 1	mandible.
	<i>h</i>	38 1, 2	mandibles.
	<i>h</i>	39 1	mandible with small symphysis.
	<i>h</i>	40 1, 2	larger mandibles.
	<i>h</i>	41 1—3	thin mandibles.
	<i>h</i>	42 1, 2	thick mandibles with external mesial groove.

Case. Comp. Tablet. Specimen.

<b>J</b>	<i>h</i>	43 1—3	large massive mandibles.
	<i>h</i>	44 1	massive mandible.
	<i>h</i>	45 1—4	broad small mandibles.
	<i>h</i>	46 1, 2	mandibles broad in symphysis.
	<i>h</i>	47 1—3	similar mandibles narrow in symphysis.
	<i>h</i>	48 1—8	compressed mandibles with smooth palatal surface.
	<i>h</i>	49 1	the largest mandible in the collection.
	<i>h</i>	50 1—3	mandibles of a compressed type.
	<i>h</i>	51 1—4	similar mandibles with a slight external mesial groove.
	<i>h</i>	52 1—3	mandibles indicative of a broad short head.
	<i>h</i>	53 1	small massive mandible.
	<i>h</i>	54 1	large mandible.
	<i>h</i>	55 1—4	massive mandibles.
	<i>h</i>	56 1	sharper massive mandible.
	<i>h</i>	57 1	massive mandible.
	<i>h</i>	58 1	malar bone of a large skull.
	<i>h</i>	59 1	snout of a small <i>Rhinochelys</i> .
	<i>h</i>	60 1	slender mandible.
	<i>h</i>	61 1—5	small mandibles.
	<i>h</i>	62 1	narrow mandible.
	<i>h</i>	63 1	broad small mandible.
	<i>h</i>	64 1	mandible with small symphysis.
	<i>h</i>	65 1, 2	mandibles of a narrow compressed type.
	<i>h</i>	66 1, 2	broad, small, incurved mandibles.
	<i>h</i>	67 1, 2	mandibles with ridges on the palatal surface.

- J** *i* 1 1—47 cervical vertebræ, most of which display ordinary Chelonian characters.
- i* 2 1—26 dorsal vertebræ; the dorsal vertebræ of Chelonians and Dinosaurs approximate, so that it is often difficult to distinguish between them.
- i* 3 1—14 caudal vertebræ.
- i* 4 1—25 modifications of humerus. No. 25 exhibits in the proximal end of the humerus a conical epiphysis like that seen in *Plesiosaur*.

Case. Comp. Tablet. Specimen.

- J**   *i*   5   1—26   modifications of femur.  
           *i*   6   1—12   phalanges.  
           *i*   7   1—18   costal plates.  
           *i*   8   1—4   episternal and entosternal plates.  
           *i*   9   1—8   pygal plate.
- 
- J**   *j*   1   1—45   anterior middle and posterior marginal plates.  
       *j*   2   1—7   associated middle marginal plates.  
       *j*   3   1—2   nuchal plates.  
       *j*   4   1—16   neural plates; 15 and 16 have a Dinosaurian aspect.  
       *j*   5        1   neural plate thin and longitudinally carinate.  
       *j*   6   1—9   scapula.  
       *j*   7   1—2   right and left coracoid.  
       *j*   8   1—4   ulna.  
       *j*   9        1   ? radius.  
       *j*   10   1—3   proximal end of tibia.  
       *j*   11        1   ? anterior part of pubic bone.  
       *j*   12        1   ? symphyseal part of right ischium.  
       *j*   13   1—9   ilium. [Ischium and ilium interchange characters in different families, and probably some of these specimens, if better preserved, would have been identified as ischium.]

## CHELONIA,

FROM THE CAMBRIDGE UPPER GREENSAND,

Illustrative of Genera and Species.

Index to the Associated Remains of Chelonians, from the Cambridge Greensand. Each series of bones is regarded as part of the skeleton of one individual.

Exhibited in the Drawers of Compartment *g* of Cabinet *J*.

## Series 1. 51 Specimens.

Case.	Comp. & Drawer.	Tablet.	
<i>J</i>	<i>g</i> 1	1	anterior part of mandible*.
	<i>g</i> 1	2	malar bone.
	<i>g</i> 1	3	dorsal vertebra.
	<i>g</i> 1	4	dorsal vertebra fractured in middle.
	<i>g</i> 1	5	two cervical vertebræ which have lost their neural arches.
	<i>g</i> 1	6	right and left humerus.
	<i>g</i> 1	7	coracoid.
	<i>g</i> 1	8	ilium.
	<i>g</i> 1	9	two marginal plates.
	<i>g</i> 1	10	marginal plate.
	<i>g</i> 1	11	} marginal plates.
	<i>g</i> 1	12	
	<i>g</i> 1	13	
	<i>g</i> 1	14	

\* On each Tablet the number of the Associated Series follows that of the Drawer, and comes before the Tablet-number. Thus,  $\frac{g.i.i.i}{J}$ .

Case.	Comp. & Drawer.	Tablet.	
J	g 1	15	two marginal plates.
	g 1	16	undetermined.
	g 1	17	costal plate.
	g 1	18	marginal plate.
	g 1	19	two marginal plates.
	g 1	20	marginal plate.
	g 1	21	marginal plate.
	g 1	22	two marginal plates.
	g 1	23	marginal plate.
	g 1	24	? neural plate.
	g 1	25	marginal plate.
	g 1	26	two marginal plates.
	g 1	27	costal plate.
	g 1	28	costal plate.
	g 1	29	anterior marginal plate.
	g 1	30	two marginal plates.
	g 1	31	three middle marginal plates.
	g 1	32	two middle marginal plates.
	g 1	33	marginal plate.
	g 1	34	two middle marginal plates.
	g 1	35	undetermined plate.
	g 1	36	anterior marginal.
	g 1	37	marginal.
	g 1	38	middle marginal.
	g 1	39	pygal plate.

## Series 2. 48 Specimens.

J	g 2	1	? shaft of scapula.
	g 2	2	? shaft of coracoid.
	g 2	3	? proximal end of radius.
	g 2	4	? scapula arch.
	g 2	5	? ischium.
	g 2	6, 7	right and left humerus.
	g 2	8	proximal end of ulna.
	g 2	9	undetermined fragment of shaft.
	g 2	10	articular end of a long bone.
	g 2	11	distal end of radius.

Casa.	Comp. & Drawer.	Tablet.	
J	g 2	12	neural arch.
	g 2	13	two undetermined fragments.
	g 2	14	5th cervical vertebra.
	g 2	15	late cervical vertebra without the neural arch.
	g 2	16	? ilium.
	g 2	17	? neural arch.
	g 2	18	marginal plate.
	g 2	19	neural plate.
	g 2	20	two costal plates.
	g 2	21	costal plate.
	g 2	22	? pubis.
	g 2	23	marginal plate.
	g 2	24	two marginal plates.
	g 2	25	two marginal plates.

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J	g 3	26	two marginal plates.
	g 3	27	two marginal plates.
	g 3	28	marginal plate.
	g 3	29	costal plate.
	g 3	30	costal plate.
	g 3	31	two costal plates.
	g 3	32	five fragments of costal plates.
	g 3	33	costal plate.
	g 3	34	? marginal plate.
	g 3	35	marginal plate.
	g 3	36	two marginal plates.

---

## Series 3. 15 Specimens.

J	g 3	1	cervical vertebra.
	g 3	2	distal end of humerus.
	g 3	3	proximal end of femur.
	g 3	4	ilium.
	g 3	5	marginal plate.
	g 3	6	marginal plate.
	g 3	7	eight costal plates.

---



## Series 4. 27 Specimens.

Case.	Comp. & Drawer.	Tablet.	
J	g 4	1	skull and lower jaw.
	g 4	2	three cervical vertebræ.
	g 4	3	mid-dorsal vertebra.
	g 4	4	two posterior dorsal vertebræ.
	g 4	5	undetermined.
	g 4	6	proximal end of humerus.
	g 4	7	proximal and distal ends of humerus.
	g 4	8	proximal end of femur.
	g 4	9	distal end of femur.
	g 4	10	? distal end of tibia.
	g 4	11	fragment of small scapula and coracoid arch.
	g 4	12	neural plate.
	g 4	13	two costal plates.
	g 4	14	two marginal plates.
	g 4	15	three marginal plates.
	g 4	16	four mid-marginal plates.

## Series 5. 15 Specimens.

J	g 4	17	mandible, articular parts broken.
	g 4	18	anterior cervical vertebra.
	g 4	19	posterior cervical vertebra.
	g 4	20	? fragment of pubis.
	g 4	21	fragment of scapula arch.
	g 4	22	fragment of long bone undetermined.
	g 4	23	scapula arch.
	g 4	24	humerus.
	g 4	25	proximal end of humerus.
	g 4	26	fragment.
	g 4	27	fragment.
	g 4	28	proximal and distal end of radius.
	g 4	29	proximal end of femur.
	g 4	30	? distal end of femur.

J	g 4	31	maxillary bones of a large Chelonian.
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## Series 6. 20 Specimens.

The remains in this Drawer belong to a new Emydian genus which had an exterior pustulous ornamentation not unlike *Trionyx*, and was covered with scutes. It may be named **TRACHYDERMOCHELYS**.

Case.	Comp. & Drawer.	Tablet.	
<b>J</b>	<i>g 5</i>	1	three cervical vertebrae.
	<i>g 5</i>	2	posterior dorsal vertebra.
	<i>g 5</i>	3	proximal end of humerus.
	<i>g 5</i>	4	proximal end of femur.
	<i>g 5</i>	5	ilium.
	<i>g 5</i>	6	marginal plate.
	<i>g 5</i>	7	six fragments of marginal plates.
	<i>g 5</i>	8	five fragments of costal plates.
	<i>g 5</i>	9	[undetermined].

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## Series 7. 10 Specimens.

The following are associated.

<b>J</b>	<i>g 5</i>	10	anterior part of skull.
	<i>g 5</i>	11	fragments of seven marginal plates.
	<i>g 5</i>	12	marginal plate.
	<i>g 5</i>	13	marginal plate.

---

The following are not associated.

<b>J</b>	<i>g 5</i>	14	four neural plates.
	<i>g 5</i>	15	four marginal plates.
	<i>g 5</i>	16	two marginal plates.
	<i>g 5</i>	17	three marginal plates.
	<i>g 5</i>	18	marginal plate.
	<i>g 5</i>	19	marginal plate.
	<i>g 5</i>	20	two fragments of costal plates.
	<i>g 5</i>	21	two fragments of marginal plates.
	<i>g 5</i>	22	fragments of costal plates.
	<i>g 5</i>	23	centrum of sacral vertebra?
	<i>g 5</i>	24	centrum of sacral vertebra?

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## Series 8.

Cass.	Comp. & Drawer.	Tablet.	
J	g 6		These vertebræ and ribs of a gigantic Chelonian came into the Museum at intervals during many years, without record of the exact pits where they were found.
	g 6	1	cervical vertebra.
	g 6	2	cervical vertebra.
	g 6	3	dorsal vertebra.
	g 6	4	dorsal vertebra.
	g 6	5	neural arch of a dorsal vertebra.
	g 6	6	neural arch of a dorsal vertebra.
	g 6	7	two ribs with costal plates.
	g 6	8	rib with costal plate.

## Series 9. 15 Specimens.

J	g 6	9	two dorsal vertebræ.
	g 6	10	broken scapula and clavicle.
	g 6	11	three costal plates.
	g 6	12	five mid-marginal plates.
	g 6	13	marginal plate.
	g 6	14	pygal plate.
	g 6	15	*pygal plate.
	g 6	16	*pygal plate.

## Series 10. 27 Specimens.

J	g 7	1	skull.
	g 7	2	cervical vertebra.
	g 7	3	dorsal vertebra.
	g 7	4	distal end of humerus.
	g 7	5	acetabular end of ilium.
	g 7	6	proximal end of femur.
	g 7	7	distal end of femur.
	g 7	8	two ribs.
	g 7	9	three neural plates.
	g 7	10	three costal plates.
	g 7	11	three marginal plates.
	g 7	12	four mid-marginal plates.

\* Of another skeleton.

Cass.	Comp. & Drawer.	Tablet.	
<b>J</b>	<i>g</i> 7	13	two marginal plates.
	<i>g</i> 7	14	pygal plate.
	<i>g</i> 7	15	*pygal plate.
	<i>g</i> 7	16	*pygal plate.
<hr/>			
Series 11. 30 Specimens.			
TRACHYDERMOCHELYS.			
<b>J</b>	<i>g</i> 7	17	nine fragments of costal plates.
	<i>g</i> 7	18	ten fragments of marginal plates.
	<i>g</i> 7	19	marginal plate.
	<i>g</i> 7	20	three marginal plates.
	<i>g</i> 7	21	? ilium or scapula broken.
	<i>g</i> 7	22	? scapula or ilium broken.
	<i>g</i> 7	23	distal end of femur.
	<i>g</i> 7	24	two distal ends of humerus.
	<i>g</i> 7	25	proximal end of humerus.
	<i>g</i> 7	26	undetermined.
<hr/>			
Series 12. 31 Specimens.			
<b>J</b>	<i>g</i> 8	1	mandible.
	<i>g</i> 8	2	fifth cervical vertebra.
	<i>g</i> 8	3	dorsal vertebra.
	<i>g</i> 8	4	neural arch of cervical vertebra.
	<i>g</i> 8	5	? scapula.
	<i>g</i> 8	6	? shaft of coracoid (Parker and Owen, not Huxley).
	<i>g</i> 8	7	? ilium.
	<i>g</i> 8	8	two proximal and two distal ends of humeri.
	<i>g</i> 8	9	femur.
	<i>g</i> 8	10	neural plate.
	<i>g</i> 8	11	six fragments of costal plates.
	<i>g</i> 8	12	five marginal plates.
	<i>g</i> 8	13	four mid-marginal plates.
	<i>g</i> 8	14	two marginal plates.
	<i>g</i> 8	15	marginal plate.
	<i>g</i> 8	16	? marginal plate.
	<i>g</i> 8	17	proximal end of rib.

\* Of another animal.

## CHELONIA FROM THE

## Series 13. 49 Specimens.

Case.	Comp. & Drawer.	Tablet.	
J	g 9	1	? right frontal bone.
	g 9	2	left quadrate bone.
	g 9	3	right quadrate bone.
	g 9	4	squamosal bone.
	g 9	5	ex-occipital and supra-occipital bones (right).
	g 9	6	pre-maxillary.
	g 9	7	? mandible.
	g 9	8	cervical vertebra.
	g 9	9	two neural arches of cervical vertebra.
	g 9	10	right and left humeri.
	g 9	11	? distal end of humerus.
	g 9	12	proximal and distal ends of right and left femora.
	g 9	13	left ilium.
	g 9	14	? ilium.
	g 9	15	undetermined.
	g 9	16	carpal.
	g 9	17	undetermined fragments, chiefly of scapula arch.
	g 9	18	
	g 9	19	
	g 9	20	
	g 9	21	
	g 9	22	four neural plates.
	g 9	23	seven fragments of costal plates.
	g 9	24	five fragments of marginal plates.
	g 9	25	five fragments of mid-marginal plates.
	g 9	26	four posterior marginal plates.

## Series 14. 28 Specimens.

J	g 10	1	six fragments of dorsal vertebræ.
	g 10	2	four fragments of costal plates.
	g 10	3	fragment of plate.
	g 10	4	? carpal.
	g 10	5	carpal, or tarsal bones.
	g 10	6	six articular ends of slender bones, probably fore-arm, &c.

Case.	Comp. & Drawer.	Tablet.	
<b>J</b>	<i>g</i> 10	7	} undetermined fragments.
	<i>g</i> 10	8	
	<i>g</i> 10	9	
	<i>g</i> 10	10	
	<i>g</i> 10	11	
	<i>g</i> 10	12	
	<i>g</i> 10	13	
	<i>g</i> 10	14	
	<i>g</i> 10	15	

With this Series was found a multitude of other fragments too much mutilated for determination.

On Shelf *a*, Cabinet LXXXIX., are placed the head and shaft of an enormous Chelonian humerus and two associated carpal bones. Coldham Common. Presented by Rev. H. G. Day.

## PLESIOSAURIA

## FROM THE CAMBRIDGE GREENSAND.

Exhibited in the upright Cabinets which face Cabinet J.

## CABINET LXXXIX.

## HUMERUS AND FEMUR.

Case.	Shelf.	No.	
89	b	1	An elongated narrow femoral bone with trochanter developed, very thin at distal end; apparently worn and broken: anterior side nearly straight; posterior outline slightly concave.
		2—6	Various examples of humerus and femur of the short, broad, massive type, somewhat Pliosauroid in form, which never develops smooth articular surfaces or a trochanter, the ends apparently remaining cartilaginous.
	c	2—6	Other examples of these massive limb-bones, apparently indicating with those on shelf b two or three species. The circular pits at the proximal and distal ends should be noticed; as also the large perforations at the middle of the concave posterior border for the nutritive artery and vein of the bone.

Cass.	Shelf.	No.	
89	c	1	A small bone, unusually slender and cylindrical in the upper part of the shaft, slightly expanding into an ovate boss at the proximal end.
	d	1—6	Various examples of slender elongated bones expanding but little at the distal end, mostly worn.
	e	1—6	1—4 humerus; 5, 6 femora. e 4 shows in the proximal end the conical epiphysis descending half-way down the middle of the shaft. e 6 is singularly truncated at the distal end.
	f	1	Humerus of the massive type, split vertically to show the enormous proximal and distal epiphyses and the small girdling shaft. It also shows the central arterial cavity and the course of some of the blood-vessels which traverse the epiphyses to their proximal and distal terminations.
	f	2—6	Humerus and femur, mostly worn.
	g	1—6	Humerus and femur, mostly worn at distal end.
	h	1—6	Humerus of types broad at the distal end.



## PLESIOSAURIA

FROM THE CAMBRIDGE UPPER GREENSAND.

Index to the Associated Remains of Plesiosaurs, from the Cambridge Greensand. Arranged to illustrate Species and Genera. The remains are for the most part vertebræ, and the great bones of the limbs. No part of the skull is met with, except the basi-occipital bone. Each Series is regarded as part of the skeleton of one individual.

Exhibited on the Shelves of the upright Cabinets  
XC.—XCV.

## CABINET XC.

## Series 1. 8 Specimens.

Cass.	Shelf.	Spm.	
90	aa	1—8	1—6 posterior dorsal vertebræ; 7, 8 caudal.

## Series 2. 23 Specimens.

a	1—10	1—3 posterior cervical; 4 pectoral; 5—10 dorsal vertebræ.
b	1—13	1—7 posterior dorsal; 8 sacral; 9—13 caudal vertebræ.

## Series 3. 24 Specimens.

c	1—24	1 basi-occipital; 2 free axis; 3—11 cervical; 12, 13 pectoral; 14—17 dorsal; 18 cervical neural arch; 19—21 fragments of bones of the pectoral arch; 22, 23 femora; 24 humerus.
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## Series 4. 14 Specimens.

Case.	Shelf.	Spm.	
90	d	1—14	d 1, 2 cervical; 3, 4 pectoral (in 4 the rib appears to have had two heads); 5—14 dorsal (13, 14 are one vertebra sawn in halves).
	d	15—18	four vertebræ, a cervical and three dorsal, which resemble in preservation and characters the foregoing series.

Series 5. 36 Specimens. *Plesiosaurus planus* (Owen).

e	1—36	1—8 anterior cervical vertebræ; 9—14 middle cervical; 15, 16 posterior cervical; 17 pectoral; 18—29 dorsal; 30—36 caudal.
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[This series appears to include the remains of more than one individual.]

## Series 6. 16 Specimens.

f	1—16	1—12 dorsal; 13, 14 parts of coracoids; 15, 16 proximal ends of humerus.
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## Series 7. 13 Specimens.

g	1—13	1—4 cervical; 5—8 pectoral; 9—12 dorsal; 13 caudal vertebræ.
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## CABINET XCI.

Case.	Shelf.	Spm.	Tablet.
91	aa	1	humerus of a Plesiosaur.
	aa	2	ten phalanges of a Plesiosaur.

## Series 8. 20 Specimens.

a	1—20	1—11 cervical; 12, 13 pectoral; 14—18 dorsal vertebræ; 19, 20 femora.
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## Series 9. 72 Specimens.

b	1—2	femora.
c	1—11	c 1, 2 humerus; 3, 4 parts of pubic arch; 5 carpal; 6—11 phalanges.

Cass.	Shelf.	Spm.	Tablet.
91	<i>d</i>	1—18	1 basi-occipital; 2 atlas and axis; 3—18 cervical vertebræ.
	<i>e</i>	1—15	1—7 cervical; 8, 9 pectoral; 10—15 neural arches and ribs.
	<i>f</i>	1—13	1 pectoral; 2—13 dorsal.
	<i>g</i>	1—18	1—18 caudal.

## CABINET XCII.

92	<i>aa</i>	1 humerus.
		2 femur.
		3 humerus, reputed to be the type of <i>Plesiosaurus pachyomus</i> (Owen).

## Series 10. 41 Specimens.

<i>a</i>	1—3	1, 2 femora; 3 humerus.
<i>b</i>	1—22	1 basi-occipital; 2—22 cervical.
<i>c</i>	1—16	1—5 cervical; 6—9 pectoral; 10—14 dorsal; 15, 16 caudal vertebræ.

## Series 11. 35 Specimens.

<i>d</i>	1—15	1 femur; 2 coracoid; 3 humerus; 4 atlas and axis; 5—15 cervical vertebræ.
<i>e</i>	1—19	1—5 dorsal; 6 sacral; 7—15 caudal; 16, 17 neural arch; 18 rib; 19 epiotic?

## Series 12. 11 Specimens.

<i>f</i>	1—11	1—6 cervical vertebræ; 7—10 dorsal; 11 femur.
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## Series 13. 16 Specimens.

<i>g</i>	1—16	1 atlas and axis; 2—5 cervical; 6—16 caudal vertebræ.
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## CABINET XCIII.

## Series 14. 8 Specimens.

Cass.	Shelf.	Spec.	Tablet.
93	aa	1	1—6 cervical vertebræ.
	aa	2	humerus.
	aa	3	femur.

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## Series 15. 9 Specimens.

a	1—9	1, 2 cervical; 3, 4 pectoral; 5—7 dorsal; 8 sacral; 9 caudal vertebræ.
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## Series 16. 18 Specimens.

b	1—18	1—6 cervical; 7—11 dorsal; 12 sacral; 13—15 caudal vertebræ; 16 humerus; 17, 18 femora.
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## Series 17. 11 Specimens.

c	1—11	1—3 cervical; 4—10 dorsal; 11 femur.
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## Series 18. 15 Specimens.

d	1—15	1—5 cervical vertebræ; 6—12 dorsal; 13 humerus; 14, 15 femora.
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## Series 19. 29 Specimens.

e	1—29	1—20 cervical; 21—26 dorsal; 27—29 caudal vertebræ.
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## Series 20. 10 Specimens.

f	1—10	1—3 cervical; 4—6 pectoral; 7—9 dor- sal vertebræ; 10 femur.
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## Series 21. 15 Specimens.

g	1—15	1—13 cervical vertebræ; 14, 15 pectoral or dorsal.
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## CABINET XCIV.

Case.	Shelf.	Spm.	Tablet.
94	aa	1	an elongated femur.
		2	? femur of the <i>Pl. pachyomus</i> type.
		3	humerus with a large head and truncated distal end.

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## Series 22. 55 Specimens.

<i>a</i>	1—8	1, 2 humerus; 3, 4 femora; 5—7 carpal bones; 8 neural arch.
<i>b</i>	1—26	1—17 cervical; 18—20 pectoral; 21—23 dorsal; 24, 25 ischia; 26 ilium.
<i>c</i>	1—21	1—12 dorsal; 13—15 sacral; 16—21 caudal vertebræ.

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## Series 23. 45 Specimens.

<i>d</i>	1—45	1—13 cervical; 14—16 pectoral; 17—30 dorsal; 31, 32 sacral; 33—40 caudal vertebræ; 41 humerus; 42—45 fragments of bones of pelvic arch.
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## Series 24. 26 Specimens.

<i>e</i>	1—26	1—7 cervical; 8—13 dorsal; 14—16 post dorsal; 17—26 caudal vertebræ.
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## Series 25. 13 Specimens.

<i>f</i>	1—13	1—6 cervical; 7—10 dorsal; 11 caudal vertebræ; 12 femur; 13 humerus.
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## Series 26. 8 Specimens.

<i>g</i>	1—8	1—8 cervical vertebræ.
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## CABINET XCV.

## POLYPTYCHODON.

Case.	Shelf.	Spm.	Tablet.
95	<i>a</i>	1—8	1 reputed atlas and axis; 2—4 cervical vertebrae; 5 larger cervical; 6—8 fragments of ribs.
	<i>b</i>	1—49	1—49 teeth of Polyptychodon.
	<i>c</i>	1—14	50—63 teeth of Polyptychodon.
	<i>d</i>	1—40	64—103 teeth of Polyptychodon.

## Associated Series of POLYPTYCHODON.

<i>e</i>	1—5	1 atlas and axis; 2—5 cervical vertebrae.
<i>f</i>	1—5	6 cervical; 7—10 dorsal.
<i>g</i>	1—5	11—15 dorsal vertebrae.

## MACRUROSAURUS.

89	<i>i</i>	1—4	caudal vertebrae.
90	<i>h</i>	1—4	caudal vertebrae.
91	<i>h</i>	1—4	caudal vertebrae.
92	<i>h</i>	1—4	caudal vertebrae.
93	<i>h</i>	1—5	caudal vertebrae.
94	<i>h</i>	1—6	caudal vertebrae.
95	<i>h</i>	1—11	caudal vertebrae.

The first 23 vertebrae of this series were found on Coldham Common. The small part of the tail is from Barton, and was presented by the Rev. W. Shaw. It may be part of the same individual. The last three vertebrae are part of another individual: one vertebra is biconcave, and appears to indicate the beginning of the biconcave part of the tail.

The early caudal vertebrae are procæalous, with the cup and ball well developed; the sides of the centrum approximate inferiorly to a rounded ridge, and they give off strong transverse processes below the neural arch. The transverse processes soon disappear, and the centrum is rounded and smooth like a dice-box. There are no chevron bones. The centrum of the earliest caudal vertebra preserved measures in length  $7\frac{1}{2}$  inches.

## PLESIOSAURIA

## FROM THE CAMBRIDGE UPPER GREENSAND.

Index to the Plesiosauria from the Cambridge Greensand.

Associated sets of bones, illustrations of Plesiosaur Osteology,  
&c.

Exhibited in drawers of Compartment e of Cabinet J.

Cas.	Comp.	Drawer.	Tablet.	No.	
J	e	1		170	teeth, chiefly duplicate, of Polyptychodon.

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Associated Series of Plesiosaurus.

J	e	2	1	1—11	sacral and 7 early caudal vertebræ of a Plesiosaur, and 3 fragments of ? pubic bones associated.
	e	2	2	1—10	associated cervical and dorsal vertebræ.
	e	2	3	1—7	associated vertebræ; 1 and 4 cervical, 2 and 3 pectoral, 5 dorsal, 6 caudal, 7 neural arch of dorsal.
	e	2	4	1—6	1 and 2 cervical, 3 and 4 caudal vertebræ, 5 and 6 carpal.
	e	2	5	1—3	1 and 2 pectoral, 3 dorsal vertebra.
	e	2	6	1—2	dorsal vertebræ.

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Case.	Comp.	Drawer.	Tablet.	No.	
<b>J</b>	<i>e</i>	3	1	1—11	10 cervical and dorsal vertebræ and a worn femur.
	<i>e</i>	3	2	1—7	1—3 cervical; 4, 5 dorsal; 6 caudal vertebræ; 7 humerus.
	<i>e</i>	3	3	1—7	cervical vertebræ.
	<i>e</i>	3	4	1—9	dorsal vertebræ.
	<i>e</i>	3	5	1—8	dorsal vertebræ.
	<i>e</i>	3	6	1—3	dorsal vertebræ.
	<i>e</i>	3	7	1—3	caudal vertebræ.
	<i>e</i>	3	8	1—5	1—4 dorsal vertebræ; 5 sacral.
	<i>e</i>	3	9	1—6	dorsal vertebræ.
	<i>e</i>	3	10	1—4	cervical vertebræ.
	<i>e</i>	3	11	1—2	cervical vertebræ.
	<i>e</i>	3	12	1—3	cervical vertebræ.
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<b>J</b>	<i>e</i>	4	1	1—3	1, 2 cervical; 3 dorsal.
	<i>e</i>	4	2	1—4	1—3 cervical; 4 pectoral.
	<i>e</i>	4	3	1—4	1—3 cervical; 4 pectoral.
	<i>e</i>	4	4	1—6	dorsal vertebræ.
	<i>e</i>	4	5	1—3	cervical vertebræ (presented by W. and R. Farren).
	<i>e</i>	4	6	1—6	1 pectoral; 2—6 dorsal vertebræ.
	<i>e</i>	4	7	1—4	cervical vertebræ.
	<i>e</i>	4	8	1—6	cervical vertebræ (presented by W. and R. Farren).



Case.	Comp.	Drawer.	Tablet.	No.	
<b>J</b>	<i>e</i>	4	9	1—6	cervical vertebræ (presented by W. and R. Farren).
	<i>e</i>	4	10	1—4	1, 2 cervical; 3, 4 dorsal vertebræ.
	<i>e</i>	4	11	1—4	dorsal vertebræ (presented by W. and R. Farren).
	<i>e</i>	4	12	1—4	dorsal vertebræ.
	<i>e</i>	4	13	1—4	dorsal vertebræ.
	<i>e</i>	4	14	1—3	dorsal vertebræ.
<b>J</b>	<i>e</i>	5	1	1—5	1—3 cervical; 4, 5 pectoral.
	<i>e</i>	5	2	1—4	dorsal vertebræ.
	<i>e</i>	5	3	1—4	cervical vertebræ.
	<i>e</i>	5	4	1—7	cervical and early dorsal vertebræ.
	<i>e</i>	5	5	1—8	dorsal vertebræ.
	<i>e</i>	5	6	1—7	dorsal vertebræ (reputed associated with <i>e. 5. 5</i> ).
	<i>e</i>	5	7	1—4	dorsal vertebræ.
	<i>e</i>	5	8	1—5	pectoral and early dorsal vertebræ.
	<i>e</i>	5	9	1—2	dorsal vertebræ.
	<i>e</i>	5	10	1—2	dorsal vertebræ.
	<i>e</i>	5	11	1—2	dorsal vertebræ.
	<i>e</i>	5	12	1—3	dorsal vertebræ.
	<i>e</i>	5	13	1—3	dorsal vertebræ.
	<i>e</i>	5	14	1—3	cervical vertebræ.
	<i>e</i>	5	15	1—3	pectoral vertebræ.

Case.	Comp.	Drawer.	Tablet.	No.	
<b>J</b>	<i>e</i>	5	16	1	cervical vertebra.
	<i>e</i>	5	17	1	cervical vertebra.
	<i>e</i>	5	18	1	dorsal vertebra.
	<i>e</i>	5	19	1	dorsal vertebra.

Drawer 6 illustrates points in the *osteology of the genus*.

<b>J</b>	<i>e</i>	6	1	1—8	examples of cervical vertebrae.
	<i>e</i>	6	2	1—10	examples of dorsal vertebrae.
	<i>e</i>	6	3	1—10	examples of caudal vertebrae.
	<i>e</i>	6	4	1	basi-occipital bone.
	<i>e</i>	6	5	1	anchylosed atlas and axis found with <i>e. 6. 4.</i>
	<i>e</i>	6	6	1	basi-occipital bone.
	<i>e</i>	6	7	1	a tooth.
	<i>e</i>	6	8	1—13	teeth, probably of Plesiosaur.
	<i>e</i>	6	9	1	proximal end of coracoid bone.
	<i>e</i>	6	10	1	proximal end of coracoid.
	<i>e</i>	6	11	1	proximal end of ? coracoid.
	<i>e</i>	6	12	1—2	proximal end of ? coracoid.
	<i>e</i>	6	13	1	? os pubis.
	<i>e</i>	6	14	1—15	phalanges.

Drawers 7 and 8 contain chiefly odd vertebrae of various species.

<b>J</b>	<i>e</i>	7	1	1	cervical vertebra.
	<i>e</i>	7	2	1	cervical vertebra.
	<i>e</i>	7	3	1	cervical vertebra.
	<i>e</i>	7	4	2	cervical vertebrae.
	<i>e</i>	7	5	1	middle cervical vertebra.
	<i>e</i>	7	6	2	cervical vertebrae.
	<i>e</i>	7	7	2	cervical vertebrae.
	<i>e</i>	7	8	1	cervical vertebra.
	<i>e</i>	7	9	1	cervical vertebra.
	<i>e</i>	7	10	1	cervical vertebra.
	<i>e</i>	7	11	1	cervical vertebra.
	<i>e</i>	7	12	1	pectoral vertebra.
	<i>e</i>	7	13	1	dorsal vertebra.
	<i>e</i>	7	14	1	dorsal vertebra.
	<i>e</i>	7	15	1, 2	pectoral and dorsal vertebrae.
	<i>e</i>	7	16	1	dorsal vertebra.

Case.	Comp.	Drawer.	Tablet.	No.	
J	e	7	17	1	first caudal vertebra.
	e	7	18	1	late dorsal vertebra.
	e	7	19	1	early caudal vertebra.
	e	7	20	1, 2	early caudal vertebræ.
	e	7	21	1	dorsal vertebra.
	e	7	22	1—3	cervical vertebræ.
	e	7	23	1	cervical vertebra.
	e	7	24	1, 2	dorsal vertebræ.
	e	7	25	1—4	a cervical, a caudal, and a caudal sawn in halves.
	e	7	26	1, 2	early dorsal.
	e	7	27	1	dorsal.
	e	7	28	1	early dorsal.
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J	e	8	1	1—3	cervical vertebræ.
	e	8	2	1	cervical vertebra.
	e	8	3	1, 2	cervical vertebræ; 2 is fractured.
	e	8	4	1	similar triangular cervical vertebra.
	e	8	5	1	cervical vertebra.
	e	8	6	1	cervical vertebra.
	e	8	7	1	cervical vertebra.
	e	8	8	1	late cervical vertebra.
	e	8	9	1	cervical vertebra.
	e	8	10	1	cervical vertebra.
	e	8	11	1—5	vertebræ ?caudal.
	e	8	12	1	fine triangular cervical vertebra.
	e	8	13	1—6	dorsal vertebræ, two of them sawn in halves.
	e	8	14	1	vertebra.
	e	8	15	1	dorsal vertebra.
	e	8	16	1	?cervical vertebra.
	e	8	17	1	vertebra ?caudal.
	e	8	18	1	cervical vertebra.
	e	8	19	1	dorsal vertebra.
	e	8	20	1	dorsal vertebra.
	e	8	21	1	dorsal vertebra.
	e	8	22	1, 2	dorsal vertebræ.
	e	8	23	1, 2	dorsal vertebræ.

Case.	Comp.	Drawer.	Tablet.	No.	
<b>J</b>	<i>e</i>	8	24	1	dorsal vertebra.
	<i>e</i>	8	25	1	dorsal vertebra.
	<i>e</i>	8	26	1	dorsal vertebra.
	<i>e</i>	8	27	1	dorsal vertebra.
	<i>e</i>	8	28	1	dorsal vertebra.
	<i>e</i>	8	29	1	dorsal vertebra.
	<i>e</i>	8	30	1	? caudal vertebra.
	<i>e</i>	8	31	1	caudal vertebra.
	<i>e</i>	8	32	1, 2	? post dorsal.
	<i>e</i>	8	33	1	caudal vertebra.
	<i>e</i>	8	34	1	caudal vertebra.
	<i>e</i>	8	35	1	caudal vertebra.
	<i>e</i>	8	36	1	caudal vertebra.
	<i>e</i>	8	37	1	caudal vertebra.
	<i>e</i>	8	38	1	caudal vertebra.
	<i>e</i>	8	39	1, 2	anterior caudal vertebræ.
	<i>e</i>	8	40	1	caudal vertebra.
	<i>e</i>	8	41	1	vertebra.
	<i>e</i>	8	42	1	dorsal vertebra.
	<i>e</i>	8	43	1	caudal vertebra.
	<i>e</i>	8	44	1	? sacral vertebra.
	<i>e</i>	8	45	1	? sacral vertebra.
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<b>J</b>	<i>e</i>	9	1	1	humerus.
	<i>e</i>	9	2	1	humerus.
	<i>e</i>	9	3	1	femur.
	<i>e</i>	9	4	1	femur, a singular modification of the massive type.
	<i>e</i>	9	5	1	humerus.
	<i>e</i>	9	6	1	humerus.
	<i>e</i>	9	7	1	? humerus.
	<i>e</i>	9	8	1	femur.
	<i>e</i>	9	9	1	femur.
	<i>e</i>	9	10	1	humerus.
	<i>e</i>	9	11	1	humerus.
	<i>e</i>	9	12	1	humerus.
	<i>e</i>	9	13	1	distal end of humerus.
	<i>e</i>	9	14	1	proximal end of ? femur.

Case.	Comp.	Drawer.	Tablet.	No.	
<b>J</b>	<i>e</i>	9	15	1	proximal end of femur.
	<i>e</i>	9	16	1	femur.
	<i>e</i>	9	17	1	worn humerus.
	<i>e</i>	9	18	2	worn ? femora.
	<i>e</i>	9	19	1	shaft and proximal epiphysis of ? femur.
	<i>e</i>	9	20	1	? ilium.

Drawer 10 chiefly contains vertebræ too large for the other drawers.

<i>e</i>	10	1	1	cervical vertebra.
<i>e</i>	10	2	1	cervical vertebra.
<i>e</i>	10	3	1	cervical vertebra.
<i>e</i>	10	4	1—4	1—3 early, 4 late cervical vertebræ.
<i>e</i>	10	5	1	cervical vertebra.
<i>e</i>	10	6	1	dorsal vertebra.
<i>e</i>	10	7	1, 2	dorsal vertebræ. Presented by the Rev. Dr Cookson.
<i>e</i>	10	8	2	dorsal vertebræ.
<i>e</i>	10	9	4	neural arches of vertebræ.

<i>e</i>	10	10	1	? proximal end of femur of Polyptychodon.
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## ICHTHYOSAURIA

## FROM THE CAMBRIDGE GREENSAND.

THE remains of Ichthyosaurs have been less perfectly collected than those of any other order of reptiles; so that, although these animals were the most abundant of the vertebrata, the collections are small, and illustrate but imperfectly the correlation of characters in species.

These bones are contained in Cabinets IX. X. and in drawers of Compartment f of the Table-case J. They comprise about 870 specimens, of which more than 400 are teeth.

These fossils, more than others, have come to the Museum as isolated specimens; so that the collection is rich in examples of bones like the basi-occipital, every one of which must have belonged to a separate animal. There are also series of bones which have been found associated together; and these have been preserved associated, and mounted, to accumulate materials for determining the characters of species. The isolated bones have been put together chiefly in Cabinet X. to illustrate the osteology of the genus during the æra of the Cambridge Greensand. In Cabinet IX. are examples of the associated sets of bones, almost exclusively vertebræ. In one of these sets nearly 50 vertebræ were found, but the majority were badly preserved.

In Cabinet J, Compartment f, the specimens are partly osteological, illustrating teeth, vertebræ, and the smaller bones of the paddle; and partly associated sets, making,

with those exhibited in Cabinet IX., a total of 16 associated series.

The University has been indebted to the Rev. H. G. Day, to the late Lucas Barrett, Esq., to Charles Montagu Doughty, Esq., to C. Dewick, Esq., to J. F. Walker, Esq., and other gentlemen, for the gift of Ichthyosaurian specimens. But the bulk of the collection was gathered by Mr William Faren, and purchased from him.

The remains afford evidence of the existence of at least four or five distinct species in the Cambridge Upper Greensand. The finest of these, exhibited in Cabinet IX., shelves *a*, *b*, *c*, somewhat resembles the figure given by Prof. Owen of a trunk vertebra of *Ichthyosaurus campylodon*, and for that series Mr Carter's name may be retained. But neither teeth nor vertebræ afford the best characters for species, though with care the vertebræ might be made to yield differential characters; and Mr Thomas Hawkins, to whom the University is indebted for the gift of most of the Liassic Ichthyosaurs in Compartment *c* of the East Room,—with the insight which comes from daily familiarity,—in his memoirs on Ichthyosauria and Plesiosauria, drew distinctive characters from the limbs. The provisional species to which the remains must be referred will be founded on the humerus and femur.

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### CABINET IX.

#### ICHTHYOSAURUS.

[Associated series illustrative of species.]

Casa.	Shelf.	No.	
IX	<i>a</i>	1—4	Caudal vertebræ.
	<i>b</i>	1—5	Late dorsal vertebræ.
	<i>c</i>	1, 2	Late dorsal vertebræ.
		3—4	Mid-dorsal vertebræ.
		5—7	Early dorsal vertebræ.

These bones were found associated. They are arranged in their natural sequence.

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Case.	Shelf.	No.	
IX	<i>d</i>	1, 2	Early dorsal vertebræ, reputed to be part of the foregoing series, but showing characters that might belong to a different species. They are intermediate in osteological position between the series on Shelf <i>c</i> , called mid and early dorsal.
	<i>d</i>	3—9	An associated series of vertebræ of a different species, including cervical, early dorsal and mid-dorsal bones. The species is characterized by greater antero-posterior length of centrum, by stronger processes for ribs, and by lateral compression on the under side.
	<i>d</i>	10—13	Atlas and axis, 3rd cervical, early dorsal, and late dorsal vertebra of a small species distinct from the foregoing.
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	<i>e</i>	1—6	Cervical and early dorsal vertebræ.
	<i>f</i>	1—7	Early dorsal, mid-dorsal vertebræ, and ribs.
	<i>g</i>	1—14	Late dorsal, early middle and late caudal vertebræ, fragment of humerus, epiotic and undetermined bone.  This is a selection from an associated series numbering nearly 50 vertebræ. They are badly preserved, and, from some of the bones being invested with iron pyrites, appear to have lain on the Galt. They are regarded as a distinct species from the series <i>a</i> , <i>b</i> , <i>c</i> , and from <i>d</i> . 3—9: differing from the former in greater breadth, and rotundity of transverse outline, especially on the ventral part of the centrum; and from the latter in wanting the pinched aspect of the ventral surface of the centrum.  <i>g</i> . 1 shows on the left side <i>three</i> articular tubercles for the rib.



Cass.	Shelf	No.	
IX	<i>g</i>	1—14	The vertebræ ( <i>g</i> . 10 and 11) are worth examination, as they are from near the most flexible part of the tail, having the intervertebral articular surfaces rounding and extending to the mesial part of the centrum. It was on the evidence of such like vertebræ that whales were attributed to the Cambridge Greensand fauna.

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- IX *h*      1—6    Cervical, early and late caudal vertebræ.  
 These most resemble in form and size the series on Shelf *g*, but in antero-posterior extent are shorter; the neural arch also is smaller, and the costal tubercles are relatively large, though not elongated as in *d*. 3—9. *h*. 6 is a very cetoid-looking bone.
- h*      7—12    Early dorsal, mid-dorsal, and caudal.  
 An animal with the early and mid-dorsal vertebræ broader from side to side than in any of the foregoing series. The elevated rounded bosses for the ribs are wide apart; the neural arch is wide. The hæmal surface is rounded.
- h*      13—17    Examples of caudal vertebræ.  
 13 and 14 are vertical sections through an early caudal vertebra, to show the convexity of the outer two-thirds of the cup characteristic of caudal vertebræ.  
 16 and 17 are from beyond the region of ribs, near the termination of the tail. They differ from most of the vertebræ from that region in their remarkable shortness.
-

Case. Shelf.

No.

IX i

- 1—4 Atlas and axis ankylosed, cervical, mid-dorsal, and early caudal vertebræ.

These bones are rather larger than the dark series *h.7*—12, but show essentially the same characters. The atlas and axis are not well preserved; the axis has two tubercles for the rib, the upper one so large that but a very small part of the rib could have been supported on the neural arch. The broad cervical vertebra similarly shows the upper facet large, concave, and *entirely on the centrum*. This structure prevails in all the cervical vertebræ of Cretaceous Ichthyosaurs in the Woodwardian Museum, and no indications are seen of the upper rib-head being supported on the neural arch, as described from Lias specimens by Professor Owen.

- i 5—9 Early and late dorsal and caudal vertebræ. They are short from front to back. The caudal vertebræ are shorter than those from the dorsal region; vertically they are very high, narrow from side to side, and flattened on the ventral surface.
- i 10—14 Examples of early and lower dorsal vertebræ. Well preserved bones belonging to different species.
- i 15 [?cervical] vertebra of Ichthyosaurus from the Hunstanton limestone of Hunstanton, not well enough preserved to determine.

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Under *i* are 4 large vertebræ rejected from the foregoing series.

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Cass.	Shelf.	No.	
IX		1—14	Over Shelf <i>a</i> is an associated series of 14 small thin vertebræ from the Galt of Chesterton, apparently immature and not well preserved. Cervical to caudal.

## CABINET X.

Osteological series illustrative of the modifications of the genus in the Cambridge Greensand.

X	<i>a</i>	1—18	The basi-occipital bone of Ichthyosaurus. They may be referred to at least three species. In the larger forms the posterior aspect of the bone is sub-spherical; in the smallest it is transversely elongated. The large forms differ; some have the ex-occipital facets parallel to the neural canal, while in most those facets are concave from side to side and make a great angle with the neural canal. The condyle varies in form and in its ligament-markings.
X	<i>b</i>		Atlas and axis, basi-occipital and basi-sphenoid bones.
	<i>b</i>	1	A large atlas and axis, pentagonal in form, with the sub-pentagonal posterior cup as large as the sub-circular anterior cup for the basi-occipital. The sutural line between the bones is almost obliterated; the atlas is the thicker bone. The two inferior sides are flat and meet at a right angle.
	<i>b</i>	2	A small atlas and axis, with the sutural line distinct in the upper half of the specimen, showing the axis to be less than two-thirds the thickness of the atlas. The posterior cup is smaller than the anterior cup and much smaller than the transverse

Case. Shelf.  
X b

No.  
2

outline, which decreases in size posteriorly. The two lower sides are rounded and round into each other at the base. The heads for the ribs are wide apart; on the left side the lower tubercle is seen on the atlas near the suture.

- b 3—4 An associated basi-occipital and atlas and axis, reputed to have been found with the specimen in Case IX. *e. f. g.*, but differing in mineralization. The basi-occipital is of the large type, with the ex-occipital facets cutting off the anterior part of the neural canal; it is wide transversely in front of the condyle. The atlas and axis much resemble the specimen *b. 1*; but while this specimen is smaller than that, it is of greater antero-posterior length. The posterior cup is relatively smaller and deeper. The lower bosses for the ribs run a line through the vertebra above the central depression of the posterior cup, instead of through it as in specimen *b. 1*, or below it as in specimen *b. 2*.

- b 5—6 An associated basi-occipital and basi-sphenoid, presented by C. Montagu Doughty, Esq., as part of the Doughty Collection. The basi-occipital is of the type of the species *a. 3*; it has the ex-occipital facets parallel with the neural canal and below it. The condyle is made circular by deep grooves at the sides, which make a crescent-shaped part on each of its sides: mesially the condyle has a short vertical ligament-marking in its upper half. Anteriorly the bone is sub-hemispherical, instead of being flat at its junction with the basi-sphenoid.

The basi-sphenoid is of the usual form,

Case. Shelf.  
X bNo.  
5—6

trapezoidal in inferior outline and in anterior outline; and from behind subquadrate, sending off inferior lateral wings in front. The small cup-shaped facet for the basi-occipital makes an angle of 45 degrees with the triangular palatal surface of the specimen. The inferior aspect shows impressions at the sides, for the pterygoid bones which converged behind and appear to have nearly or quite surrounded the posterior outlet of the large sub-cylindrical channel which passes obliquely backward and downward from the base of the sellatursica. This tube is described by Prof. Owen as the Eustachian tube; it appears to be the perforation for the carotids. Anteriorly the straight palatal borders extend but little in front of the cranial border. The rostrum which supported the pre-sphenoid is broken away.

- b 7—11 Examples of the basi-sphenoid bone, of which *b.7* and *b.11* are well preserved. They are all smaller than *b.6*, and indicate a well-marked distinct species. In *b.8* the quadrate articular facet for the basi-occipital, which is concave from side to side, makes an angle almost of 90° with the slightly convex inferior surface. This surface is made slightly sub-pentagonal by a short mesial rostrum in front. Between this rostrum and the perforation for the carotids is the ovoid articular facet for the (elongated) pre-sphenoid. The cranial surface is rough, suggestive of a cartilaginous box for the brain. The pterygoid bones do not impress the inferior palatal surface. The anterior aspect is convex from side to side and concave from above downward.

Case.	Shelf.	No.	
X	b	12	An atlas and axis badly preserved, but with the posterior cup very deep, as in <i>b</i> . 4.
	b	13	This is an <i>atlas</i> to which the axis was only ankylosed at its inferior border. It is the only specimen showing such a separation. It is remarkable for the great length of the flat inferior sides, which meet at an angle much less than a right angle. High on the right side may be seen the elongated tubercle for the rib. The species appears to be distinct from all others.
	b	14	A small atlas and axis, very short from front to back, and at both ends heart-shaped, with the very long inferior sides convex.
<hr/>			
X	c	1—14	Sclerotic bones defending the eye. They appear to have been slightly connected and are usually separated. Each bone is thin in front and thickens behind, the outer and back part being convex, the inside flat or concave; they are joined by an irregular sutural union or obliquely overlap. <i>c</i> . 12 is an example of three bones remaining united, and illustrates their irregular consecutive form and size. The bones are unusually thick, <i>Lias</i> specimens rarely attaining half their thickness. About 20 would complete the orbital circle. <i>c</i> . 14 is unusually thin.
	c	15—22	Examples of the quadrate bone. (Tympanic of Owen.) This is a bone of a quadrato-reniform outline, thickening distally to form the elongated crescentic longitudinally grooved condyle for the lower jaw. The specimens vary in form, and may be compared with the Chelonian quadrate bone. <i>c</i> . 15 and <i>c</i> . 16 are right and left quad-

Case.	Shelf.	No.	
X	c	15—22	rate bones from the same animal. <i>c</i> .16 (right) is mounted to show the articular facets on its inner side for the pterygoid and the deeper pit for the epiotic bone [par-occipital of Owen]. <i>c</i> .15 shows the smooth concave unarticular outer side of the bone. <i>c</i> .17 and <i>c</i> .18 are examples of left quadrate bones of more elongated type, with the articulation for the lower jaw sub-ovate, with the pit for the epiotic bone descending nearer to the condyle, and with the outer side less concave. In <i>c</i> .19 the epiotic pit is exceedingly deep and in the middle of the bone. <i>c</i> .20 is a distinct species, with a sub-circular condyle and a sub-circular facet for the pterygoid placed far back. <i>c</i> .22 is remarkable for the great transverse and short antero-posterior extent of the condyle.
	c	23—24	[Undetermined.]
X	d	1—32	Teeth. It has not been found possible to discover the same evidence of a variety of species from the teeth, as from other bones. Where the function was so similar as it must have been in the different species, it is hopeless to attempt to find an index whereby to differentiate structure in the teeth. <i>d</i> .1—14 are from the jaws of one individual. The curved teeth from the lower jaw generally have the tips of the crowns worn. Both crown and fang vary much in form and size. <i>d</i> .17 shows the immature tooth on the inner side of the pulp-cavity. Sometimes, as in <i>d</i> .21 and <i>d</i> .22, the pulp-cavity is closed below. A few specimens have the sub-quadrate fang irregular and ridged.

Case.	Shelf.	No.	
X	e	1	Part of the bone forming the outer surface of the lower jaw, apparently the dentary bone. The elevated ridge on the lower half of the inner side makes the bottom of the socket-groove for the teeth.
	e	2	A tooth with crown and part of one side worn down with use in the animal's lifetime.
	e	3	Part of the pre-maxillary bones of a large Ichthyosaurus, presented by the Rev. T. G. Bonney, M.A. The transverse section above the teeth is semi-circular; a deep groove runs along each side at about the line of the base of the fangs, dividing the lower third from the remainder of the bone. The palatal surface, as usual, rises high above the outer alveolar border; it is deeply grooved mesially, and the two halves of the palate are convex. The interspace between the upper and lower jaws, as fossilized, is little more than an eighth of an inch.
	e	4	Left pre-maxillary bone of a small Ichthyosaurus with a narrow palate.
	e	5—12	Small teeth, worn while in use in the jaws.
	e	13—14	?ilium.
<hr/>			
X	f	1—14	Humerus. Nos. <i>f.</i> 1—6 are examples of right humerus. Nos. <i>f.</i> 7—14 are left humerus. The head of the humerus is massive, oblong and rounded with a trochanteroid process descending forward half way down the short contracted shaft, from the superior posterior angle, and similar trochanteroid processes project from both the inferior lateral angles. The under side of the bone is concave. The distal end is ovate, or an elongated oblong, much



Case.	Shelf.	No.	
X	f	1—14	smaller than the proximal end, rather larger than the adjacent part of the shaft; it is oblique to the head. These bones demonstrate at least three well defined species; <i>f.</i> 10, 11, 13 illustrate them.

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X    *f*    15—28    Femur. The femora are all as large as the humeri; and the largest femora, *f.* 15, 16, are much larger and more massive than any known specimen of humerus of Ichthyosaurus from the Cambridge Greensand. Nos. *f.* 15—22 are left femur. Nos. *f.* 23—28 are right femur. They indicate at least five well defined species; *f.* 15, 17, 18, 21, 28 illustrate them.

The under side is usually flattened, the upper side convex, with a more or less defined longitudinal ridge, which slightly curves so as to indicate that the greater part of the head lies behind the plane at right angles to the distal articulation.

The proximal end is circular, sub-rhomboid, or crescentic, it is convex, and sends off on each side a trochanteroid process which makes the head massive; they extend down the short shaft towards the under surface, but do not reach the distal end.

The distal end is usually small and compressed, of an elongated ovate form, and shows two or three articular facets; its greatest extension is at right angles with the greatest width of the head.

*f.* 28 is a cast of a specimen in the collection of J. F. Walker, Esq. It differs more from the other specimens than they do among themselves, chiefly through the suppression of the trochanteroid processes at the proximal end making the head circular, but

Case.	Shelf.	No.	
X	f	15—28	the wing-like trochanteroid processes persist down the whole length of the shaft; the posterior process is the most elongated. The species may be named <i>Ichthyosaurus Walkeri</i> .
<hr/>			
X	g	1—7	Coracoid. <i>g</i> 1 left, and <i>g</i> 2 right. As preserved these are sub-quadrate bones, very thick at the mesial suture; more than half as thick at the glenoid cavity, and much compressed in the middle and at the anterior and posterior borders; they are imperfect, but do not appear ever to have had so much of the Dinosaurian form as Lias specimens. <i>g</i> 7 is reputed associated with <i>f</i> 16 and <i>a</i> 20.
	<i>g</i>	8—10	[undetermined] ? pro-otic.
	<i>g</i>	11—16	? articular bone.
	<i>g</i>	17—28	? epiotic.
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X	h	1—45	Phalange bones with ulna and radius all from one specimen. They are chiefly brick-shaped. Those from the margin have their free edge compressed and rounded. And the thin bones from the distal extremity are losing their quadrate form.
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X	i	1—8	Phalange bones united during the lifetime of the animal, end to end, forming transverse rows in the paddle.
	i	9—14	portions of the paddle of one <i>Ichthyosaurus</i> in which all the bones are united by intervening osseous tissue into a solid sheet of bones.
	i	15—18	the larger bones of the fore-arm of <i>Ichthyosaurus</i> .

## ICHTHYOSAURIA

FROM THE CAMBRIDGE UPPER GREENSAND.

Exhibited in Drawers of Compartment f of Cabinet J.

Case.	Comp.	Drawer.	Specimen.	
J	f	i	1—398	Teeth, from many different individuals, presenting every attainable modification of size and form. It has not been found possible to recognise more than one specific shape; and as no characteristic teeth of Plesiosaurus have ever been found it has been suspected that while this form of tooth, known as Ichthyosaurus campylodon, must have been common to several species of Ichthyosaurus, it may also have pertained to some Plesiosaurs.
J	f	ii	1—43	The whole of the vertebræ in this drawer are from the terminal part of the tail.
			44—46	They are quite unlike the ordinary type of Ichthyosaurus. The larger specimens make an approximation to the form of the caudal vertebræ in Cetaceans, and were formerly supposed to be the vertebræ of whales. They are sub-circular, with a small central depression on the articular intervertebral face of the centrum, which has its outer part tumid,
			47—50	
			51, 52	
			53—56	
			57, 58	
			59—61	
			62—65	
			67—70	

Case. Comp. Drawer. Specimen.  
**J** *f* **ii**

71—73

74

75—81

and rounding into the free external surrounding side, which is short and rugose; sometimes the intervertebral articular surfaces of a centrum are so convex as to meet each other. Occasionally there is a slight indication of a small tubercle for a rib. These vertebrae are from the most flexible part of the tail, near to its termination. Beyond them the vertebrae are compressed from side to side, and elongated in antero-posterior extent. Then the articular intervertebral surfaces again become flattened, and the vertebra is constricted in the middle, so as to be not unlike in form to the dorsal vertebra of a small crocodile. The neural arch is not preserved, but persisted nearly to the end of the tail. The smaller sets of bones are associated series.

*f.* **ii.** 45, 47, 48 are worth examination from the concentric ridged markings on the articular surface, so noticeable in vertebrae of whales.

**J** *f* **iii**

1—7

An associated series of bones of Ichthyosaurus from the upper chalky part of the Cambridge Upper Greensand. They are imperfectly mineralized with phosphate of lime, and have suffered from abrasion in the washing mill.

**iii.** 1 is a large globose basi-occipital bone. The sub-circular saucer-shaped facets for the ex-occipital bones are below the plane of the neural canal, and appear to truncate it behind. Anteriorly the facet for the basi-sphenoid bone is divided into two equal lateral parts by

Case.	Comp.	Drawer.	Specimen.	
J	f	iii	1—7	<p>a deep vertical groove which superiorly encroaches between the ex-occipital facets in front.</p> <p>iii. 2. A large broad basi-sphenoid, [apparently showing that the pterygoid bones embraced it behind]. The posterior facet for the basi-occipital bone makes an angle of about 45° with the palatal surface, and like the opposed surface of the basi-occipital has a vertical mesial groove, deepest superiorly.</p> <p>iii. 3. Quadrate bone mounted to show the exterior surface and the sub-quadrate articular condyle.</p> <p>iii. 4, ?supra-occipital. This bone is in shape not unlike half a link of a chain.</p> <p>iii. 5, not determined [? pro-otic].</p> <p>iii. 6, left femur.</p> <p>iii. 7, undetermined [? fragment of quadrate bone]</p>
J	f	iii	8—18	<p>8, Basi-occipital bone. 9, distal end of quadrate bone. Both these bones indicate a species very unlike the foregoing. 10, undetermined [? pro-otic]. 11, undetermined. 12, distal end of humerus. 13, right scapula mounted to show the external side. It corresponds closely with Liassic specimens, and approximates nearly to the Dinosaurian and Crocodilian form, differing chiefly in a straighter anterior border. 14, 15 are early mid-dorsal vertebræ, noticeable for the convexity of the outer border of the cup, and the prominence of the tubercles for the ribs, which are confluent with the border of the anterior intervertebral articular cup. The ex-</p>

Case.	Comp.	Drawer.	Specimen.	
J	f	iii	8—18	ternal surfaces are concave from front to back, and on the hæmal angle round into each other from side to side. 16 is a late dorsal vertebra with the two tubercles almost confluent on each side and but little above the flattened external hæmal surface of the centrum. 17, 18 are respectively early and mid-caudal vertebræ, and are attaining a more circular outline. 16 is largest in outline and longest from front to back of these vertebræ, 18 is shortest from front to back, but is larger in outline than 14 and 15.
J	f	iii	19—44	Bones illustrative of the hand of Ichthyosaurus; brick-shaped bones, and less regular bones from the borders.
J	f	iii	45—55	Phalange bones, being those called ulna and radius and carpals. It is difficult to assign names to the bones severally.
J	f	iii	56—65	Teeth. 56 and 57 show the varying extent to which the sub-quadrate fang is absorbed by the external pulp which develops the new tooth. They also show the proper internal pulp cavity of the tooth filled with iron and crystals of lime. 62 shows the germ tooth in its pulp cavity matrix on the inner side of the fang. 63, 64 is a tooth split open to show the internal conical pulp cavity, which may be observed to be entirely closed at its base with osseous matter. 65 is a fragment of a jaw with teeth <i>in situ</i> . That one with the number 65

Case. Comp. Drawer. Specimen.

**J** *f* iii 56—65

upon it is a partially developed tooth with a circular base, still surrounded with the walls of the old tooth fang, now absorbed to extreme thinness. On the left is the smallest of germs just growing in a cavity on the fang, to which it appears to be adherent. 58—61 are teeth of Ichthyosaurus which have lost their external enamel and so present smooth crowns.

**J** *f* iv 1—23

Associated vertebræ, chiefly neck and tail bones of an Ichthyosaurus. They include basi-occipital, atlas and axis, 9 cervical vertebræ, 3 dorsal and 9 early caudal vertebræ. With them were found as many more of the bones of the back in a bad state of preservation. The cervical vertebræ have the heads for the ribs wide apart, the lower one below the middle of the bone and adjacent to the anterior border, while the superior one is much larger, a little further backward, and so placed that while the upper head of the rib must have touched the base of the neural arch it was yet chiefly supported on the centrum. The caudal vertebræ numbered 20, 21 and 22 are remarkable for the flatness of the outer part of the articular cup. As usual the caudal and dorsal vertebræ are larger in the outline of the cup than the cervical vertebræ.

**J** *f* v 1—25

Much of the vertebral column of an Ichthyosaurus, presented by J. F. Walker, Esq. 1, atlas and axis. 2—9, probably cervical vertebræ, though from the low

Case. Comp. Drawer. Specimen.  
**J** *f* *v* 1—25

position of the upper tubercle for the rib in Cretaceous Ichthyosaurs the neck is not always easily distinguished from the back in worn specimens. The centrum enlarges in size in passing backward from the head, becomes longer from back to front, and exchanges the sharp mesial angle made by the hæmal surfaces for a regular semi-circular outline. 10—17 are dorsal vertebræ; 10—12 early dorsal, 13—15 mid-dorsal, 16, 17 late dorsal. 18—24 are caudal vertebræ. 25 is a femur.

Drawers VI., VII., VIII., IX. of Compartment *f* of Cabinet **J** are at present unfilled.

**J** *f* *x* 1—4 Examples of early cervical vertebræ mounted to exhibit the form, size, and position of the tubercles for the ribs, especially the large upper head confluent with the neural arch and the small tubercle below. In No. 2 the lower tubercle is so small that it might be overlooked. Early cervical vertebræ usually have a somewhat heart-shaped form.

**J** *f* *x* 5—7 Early, middle and late dorsal vertebræ. The two tubercles for the ribs will be seen to descend on the side of the centrum in passing from the pectoral to the pelvic region, and with this change comes a corresponding change in the outline of the cup for the intervertebral substance, the cup being always widest from side to side between the tubercles for the ribs.



Case.	Comp.	Drawer.	Specimen.	
J	f	x	6—12	Caudal vertebræ from the post-pelvic region, where ribs are developed and supported from a single tubercle. The tubercles are as low on the sides of the centrum as can be without passing on to the base. The bones are short from front to back.

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J	f	x	13—16	Associated. 13, coracoid. 14, articular end of lower jaw. 15, articular end of quadrate bone. 16, undetermined [? post frontal]. The coracoid is the largest yet found. The lower jaw is not deep at the articulation.
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In the supplementary series, LXXXII., are two drawers of odd bones of Ichthyosaurus from the Cambridge Greensand, chiefly vertebræ.

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## REPTILIA FROM THE GALT.

THE only Reptilian fossils hitherto obtained from the Galt are a large Chelonian humerus from Barnwell, placed in Compartment *j* of Table-case **J**; and the series of fourteen associated vertebræ of a small Ichthyosaur from Chesterton, placed over Shelf *a* of Cabinet IX.

## ICHTHYOSAURIA

## FROM THE POTTON SANDS.

Index to the Remains of Ichthyosaurs from the Potton Sands of Potton and the adjacent country in Bedfordshire, and from the Wicken beds of Wicken on the Cam in Cambridgeshire. The sands in these localities are overlain by the Galt, and appear to rest for the most part upon the clay-equivalent of the Coral Rag [*Amphill Clay*], well seen upon the Bedford and Luton Railway. The specimens are mineralized with phosphate of lime, and occur in ferruginous sand. They are in general but little worn.

Exhibited on Shelves *b* and *c* of Cabinet IV. to illustrate the osteology of the genus at the æra of the Potton Sands.

## ICHTHYOSAURUS.

## CABINET IV.

Cabinet.	Shelf.	Specimen.	
IV	<i>b</i>	1—2	coracoid of Ichthyosaurus.
		3—17	examples of humerus of Ichthyosaurus indicative of four species.
		18	femur of Ichthyosaurus.
	<i>c</i>	1—7	cervical vertebræ of Ichthyosaurus.
		8—9	anchylosed atlas and axis of Ichthyosaurus.
		10—11	early dorsal vertebræ of Ichthyosaurus.
		12—14	mid dorsal vertebræ of Ichthyosaurus.
		15, 17	late dorsal vertebræ of Ichthyosaurus.
		16, 18—24	caudal vertebræ of Ichthyosaurus.

## PLESIOSAURIA

FROM THE POTTON SANDS OF POTTON AND WICKEN.

Exhibited on the Shelves of the upright Cabinets IV., V., VI.

## PLESIOSAURUS.

Cabinet.	Shelf.	Specimen.	
IV	<i>d</i>	1	right scapula of Plesiosaurus.
		2—11	fragments of humerus or femur of Plesiosaurus.
		12—13	proximal epiphyses of humerus or femur of Plesiosaurus.
		11—16	fragments of os pubis of Plesiosaurus.
	<i>e</i>	17	ilium of Plesiosaurus.
		1—11	larger bones of the wrist and fore-arm of Plesiosaurus.
		12—21	phalanges of Plesiosaurus.
	<i>f</i>	1—34	phalanges of Plesiosaurus.

## CABINET V.

## Genus Plesiosaurus.

V	<i>a</i>	1—68	cervical vertebræ of various species of Plesiosaurs, varying much in size, in the length of the centrum, and the depth of the intervertebral cup. Only one specimen, <i>a</i> . 45, is from Wicken, and indicates a species different from all the Potton forms.
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Cabinet.	Shelf	Specimen.	
V	<i>b</i>	1—12	small cervical vertebræ of Plesiosaurs. <i>b</i> . 6, a well-marked species, is from Wicken.
	<i>b</i>	13—34	pectoral* [and sacral] vertebræ of various species of Plesiosaurs, some of them remarkable for the large Nothosauroid aspect of the tubercle for the rib.
	<i>b</i>	35—45	dorsal vertebræ of Plesiosaurs. <i>b</i> . 40 has a Dinosaurian depth of centrum. <i>b</i> . 41 is remarkable for the shortness of the centrum, as <i>b</i> . 44 and 45 are for the length of the centrum; an example of this latter form, from the Kimeridge Clay of Ely, is contained in Case LXXXII. Shelf <i>k</i> .
	<i>b</i>	46—48	neural arches of dorsal vertebræ.
	<i>c</i>	1—55	dorsal vertebræ of various species of Plesiosaurus. <i>c</i> . 8 and <i>c</i> . 53 are from Wicken.
	<i>d</i>	1—33	dorsal vertebræ of various species of Plesiosaurus. <i>d</i> . 5 is an instructive example of Pliosaurus. Several specimens are from Wicken.
	<i>d</i>	34—67	caudal vertebræ of various species of Plesiosaurus.
	<i>e</i>	1—19	worn specimens of humerus and femur of Plesiosaurs. <i>e</i> . 1—3 are probably Pliosaurus. <i>e</i> . 1 and <i>e</i> . 16—18 are from Wicken.
	<i>e</i>	20	left scapula of Plesiosaurus.

## CABINET VI.

## Genus Pliosaurus.

VI	<i>a</i>	1—20	cervical vertebræ of various species of Pliosaurus. <i>a</i> . 9 is a peculiar new species from Wicken. <i>a</i> . 5 is caudal.
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\* The pectoral vertebræ are those in which the rib is supported partly on the neural arch and partly on the centrum. From front to back they are longer than the sacral vertebræ.

Cabinet.	Shelf.	Specimen.	
VI	b	1—30	dorsal vertebræ of Pliosaurus; they all have the centrum rather short, and display less variety of form than the cervical vertebræ. They are analogous for the most part to the form of vertebræ called by Prof. Owen Pliosaurus brachyspondylus. <i>b.</i> 13, <i>b.</i> 22, and <i>b.</i> 24—27 may be Plesiosaurs.
	c	1—27	dorsal vertebræ of various species of Pliosaurus. <i>c.</i> 8 is probably Plesiosaurian.
	c	28—32	caudal vertebræ of Pliosaurus.

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Teeth of Pliosaurus and Dakosaurus and Ichthyosaurus.

VI	d	1—16	large circular teeth of Pliosaurus, like those in the Cambridge Greensand called Polyptychodon.
	d	17—32	large Pliosaur teeth, with a smooth flattened area, like those from the Oxford and Kimeridge Clays.
	d	33—43	smaller Pliosaur teeth, curved and with coarse ribs.
	d	44, 45	small Pliosaur teeth, with the smooth area convex.
	d	46, 47	worn teeth, with two strong lateral ridges.
	d	48—54	thick teeth of Dakosaurus, with inflated sides.
	d	55—77	more slender and curved teeth of Dakosaurus.
	d	78—82	teeth of Dakosaurus.
	d	83—106	straight teeth of Dakosaurus.
	d	107—127	teeth of Ichthyosaurus.
	e	1—6	humerus and femur of Pliosaurus. <i>e.</i> 4, presented by M. R. Prior, Esq.
	e	7	carpal bone of a Pliosaur.

## DINOSAURIA

FROM THE POTTON SANDS OF POTTON.

The remains are for the most part those of *Iguanodon*  
and of animals nearly allied.

Exhibited in Cabinets VII. and VIII.

## CABINET VII.

Cabinet.	Shelf.	Specimen.	
VII	<i>a</i>	1—3	large early caudal vertebræ.
	<i>a</i>	4—15	mid caudal vertebræ.
	<i>b</i>	1—30	mid caudal vertebræ. <i>b. 27</i> is undescribed. <i>b. 5</i> , from Wicken, is ? <i>Polorosaurus</i> . <i>b. 2</i> and <i>b. 3</i> are early mid-caudal ver- tebræ.
	<i>c</i>	1, 2	neural arches of dorsal vertebræ.
	<i>c</i>	3—34	caudal vertebræ, chiefly from the later part of the tail.
	<i>c</i>	35—42	earlier caudal vertebræ.
	<i>d</i>	1—31	early caudal vertebræ. The earliest have the centrum very short, but it gradu- ally elongates, and the transverse pro- cess descends and becomes a median ridge in the middle caudal, and makes the side of the centrum angular in the tail vertebræ.
	<i>e</i>	13 & 19	appear to be portions of right and left ilium.
	<i>e</i>	14	is a sacral vertebra.
	<i>e</i>	15, 16	are sacral vertebræ, anchylosed, of two species.
	<i>e</i>	17, 18	are separate sacral vertebræ.
	<i>e</i>	1—12	are dorsal vertebræ, with the neural arches preserved.

## DINOSAURIA AND CROCODILIA.

Remains indicating two species of *Iguanodon*.

## CABINET VIII.

Cabinet.	Shelf.	Specimen.	
VIII	<i>a</i>	1—25	dorsal vertebræ.
	<i>a</i>	26, 27	cervical vertebræ of two species of <i>Iguanodon</i> .
	<i>b</i>	1—22	phalanges of <i>Iguanodon</i> : comprising examples of 1st phalange, of 2nd, 3rd, and 4th digits.
	<i>c</i>	1—41	phalanges, chiefly of <i>Iguanodon</i> : 1—3, conical claw phalanges of an un- figured type. 4, 5, short metatarsal bones of a species of <i>Dinosaur</i> . 6—10, 17, phalange 1 of digit 2. 11, 12, 14, 19, 22, 2nd phalange of digit 2. 13, 18, 20, 25, phalange 1 of digit 4. 26, phalange 2 of digit 4. 21, phalange 2 of digit 3. 23, 24, phalange 3 of digit 3. 30, 33—35, claw-phalange of digit 2. 36—39, claw-phalange of digit 3. 31, 32, claw-phalange of digit 4. 40, 41 are claws of <i>Megalosaurus</i> or <i>Ptero-</i> <i>dactyle</i> type.
	<i>d</i>	1—26	teeth of <i>Iguanodon</i> .
	<i>d</i>	27—28	fragments of <i>Iguanodon</i> jaws.
	<i>d</i>	29	basi-sphenoid bone, probably of <i>Iguanodon</i> .
	<i>d</i>	30—32	teeth of <i>Megalosaurus</i> . No. 30 presented by I. K. Esdaile, Esq.



Cabinet.	Shelf.	Specimen.	
VIII	<i>d</i>	34—45	dermal armour of a large Crocodile [ <i>? Goniopholis</i> ].
	<i>d</i>	46—48	procelian cervical and dorsal vertebræ of a Dinosaur.
	<i>d</i>	49—53	elongated caudal vertebræ without chevron-bone facets.
	<i>d</i>	54—57	cervical vertebræ of a small Crocodile.
	<i>d</i>	59—61	cervical vertebræ of other Crocodiles.
	<i>d</i>	62—66	caudal vertebræ of a Crocodile.
	<i>d</i>	67—77	dorsal vertebræ of Crocodiles.
<hr/>			
	<i>e</i>	1	distal end of left femur of <i>Iguanodon</i> .
	<i>e</i>	2	distal end of right femur of <i>Iguanodon</i> .
	<i>e</i>	3—20	undetermined [chiefly fragments of metatarsal bones of <i>Iguanodon</i> ].

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## DINOSAURIA AND OTHER REPTILIA

## FROM THE WEALDEN SERIES.

Index to the remains of Dinosaurs, Crocodiles, Ichthyosaurs, Chelonians, &c.; from the Wealden strata of Tilgate in Sussex, and of Brook in the Isle of Wight.

Exhibited in Drawers of Compartment i of Cabinet J.

Cas.	Comp.	Drawer.	Specimen.	
J	i	8	1—6	dermal scutes similar to those attributed to Hylæosaurus.
	i	8	7	portion of upper and lower jaws of Goniopholis with teeth.
	i	8	8	longer portion of jaws of same individual of Goniopholis.
	i	8	9	back of the skull of the same Goniopholis, exhibiting in the basi-occipital, parietal, post-frontal, quadrate, &c., ordinary Crocodilian characters.
	i	8	10	eight teeth of the same Goniopholis: all from Brook.
	i	8	11	perfect axis of a Dinosaur.
	i	8	12	dermal plate of a Dinosaur.
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J	i	9	1—4	teeth of Goniopholis. Brook.
	i	9	5, 6	teeth of Goniopholis. Brook.
	i	9	7	tooth of Goniopholis. Brook.
	i	9	8	tooth.
	i	9	9	three teeth of Goniopholis. Tilgate.
	i	9	10	tooth of ?Suchosaurus. Sussex.

Case.	Comp.	Drawer.	Specimen.
J	i	9	11—13 teeth of <i>Suchosaurus cultridens</i> (Owen). Tilgate.
	i	9	14—19 teeth of <i>Goniopholis crassidens</i> (Owen). Tilgate.
	i	9	20 caudal vertebra. Tilgate.
	i	9	21 sacral vertebra ? <i>Hylæosaurus</i> . Tilgate.
	i	9	22 dorsal vertebra. Brook.
	i	9	23 caudal vertebra. Tilgate.
	i	9	24 dorsal vertebra. Tilgate (compare i. 9. 22).
	i	9	25 dorsal vertebra. Tilgate.
	i	9	26 caudal vertebra. Brook.
	i	9	27 phalange of a Crocodile. Tilgate.
	i	9	28 cast of phalange 5 of digit 4 of <i>Iguanodon</i> .
	i	9	29 phalange of a Crocodile. Brook.
	i	9	30 undetermined. Brook.
	i	9	31 fragment of a rib? Tilgate. Presented by the executors of Dr Forbes Young.
	i	9	32 slender humerus of a Crocodile, imperfect at proximal end. Brook.
	i	9	33 undetermined. Brook.
	i	9	34 maxillary bone of a small <i>Iguanodon</i> . Tilgate. This specimen formed part of the Dr Forbes Young collection. Being in a soft matrix, the yellow sandstone has been removed. The bone is five inches long, and in the greater part of its length is about an inch deep, except towards the middle, where it sends up a nasal process comparable to the nasal process of the maxillary bone in Che- lone, and there the bone is two inches deep. The outer side is convex from above downward, and gently curved convexly from back to front. In front it terminates in a truncated sharp wedge-margin, which appears to have been slightly overlapped by the pre- maxillary bone. Backward the bone

Case.	Comp.	Drawer.	Specimen.	
J	i	9	34	thickens, and is produced outward and backward, away from and beyond the alveoli, in a compressed claw-like process. The upper nasal process is wide and thin, and appears to constitute the outer margin of the narine, which was large and looked forward, upward, and slightly outward. The longitudinal extent of the alveolar border is $4\frac{1}{2}$ inches, and in that distance are the sockets for 17 teeth. No teeth are preserved.
				This species appears to be new. It may be compared with Mr Fox's mandible of <i>Iguanodon</i> from Brook, figured in the <i>Paleontographical</i> volume for 1864.
J	i	9	35, 6	teeth of <i>Iguanodon</i> . Tilgate.
	i	9	37	tooth of <i>Iguanodon</i> . Brook.
	i	9	38	tooth of <i>Iguanodon</i> . Brook.
	i	9	39	tooth of <i>Iguanodon</i> [partly worn]. Tilgate.
	i	9	40—42	cast of three teeth of <i>Iguanodon</i> .
	i	9	43	fragments of two early caudal vertebræ of <i>Ichthyosaurus</i> , from Tilgate. Dr Forbes Young collection.
	i	9	44	fragment of a plate, probably of an Emydian Chelonian.
	i	9	45	fragment of a large thick plate, apparently of <i>Goniopholis</i> (displaying under surface). Tilgate.
	i	9	46	marginal plate of an Emydian Chelonian.
	i	9	47	phalange of a ?marine Chelonian.
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J	i	10	1	dorsal vertebra of a Dinosaur, from Brook.
	i	10	2	part of sacrum of a Dinosaur, from Brook.
	i	10	3	early caudal vertebra of a Dinosaur, from Brook.
	i	10	4	late caudal vertebra of ? <i>Streptospondylus</i> , from Brook.

Case.	Comp.	Drawer.	Specimen.
J	i	10	5 undetermined fragment [? neural arch of sacral vertebræ], from Brook.
	i	10	6 fragment of rib of a Dinosaur, from Tilgate.
	i	10	7 fragment of a large jaw, from Tilgate.
	i	10	8 large dorsal vertebra of Pliosauroid character, from Tilgate [imperfect].
	i	10	9 early caudal vertebra of a Dinosaur, from Tilgate [imperfect].
	i	10	10 cast of left coracoid of Iguanodon.
	i	10	11 cast of phalange 3 of digit 3 of Iguanodon.
	i	10	12 cast of phalange 1 of digit 3 of Iguanodon.
	i	10	13 cast of the reputed horn of Iguanodon, now regarded as a claw-phalange.
	i	10	14 cast of phalange 2 of digit 2 of Iguanodon or Hylæosaurus.
	i	10	15 cast of phalange 2 of digit 4 of Iguanodon.
	i	10	16 cast of claw-phalange, attributed to Megalosaurus.
	i	10	17, 18 two teeth of Megalosaurus. Brook.
	i	10	19 tooth of Iguanodon. Brook.
	i	10	20 shaft of a long bone of Pterodactyle. Tilgate.

## WEALDEN DINOSAURIA.

Arranged over Cases LXXXIX.—XCV.

- cast of the foot of a small Iguanodon, from Brook.  
Presented by S. H. Beckles, Esq.  
Figured by Prof. Owen in *Monograph of Wealden Reptiles*, Part iv. 1857.
- cast of phalange 1 of digit 3.  
Figured by Prof. Owen in *Monograph of Wealden Reptiles*, Part ii. pl. 16, 1854.
- cast of large right tibia of ? Iguanodon. Cuckfield.

- 4 cast of distal end of a large right femur of a Dinosaur. Tilgate.
  - 5 cast of tibia of Hylæosaurus.  
Figured by Prof. Owen in *Monograph of Wealden Reptiles*, Part II. pl. 7, 1857.
  - 6 cast of metatarsal bone.
  - 7 distal end of right femur of a Dinosaur, allied to Iguanodon. Supposed to be from Brook.
  - 8 proximal end of tibia, apparently associated with No. 7.
  - 9 dorsal vertebra of Iguanodon.
  - 10—15 dorsal vertebræ of a Dinosaur. Brook.
  - 16 early post sacral vertebra of a Dinosaur. Brook.
  - 17 early caudal vertebra of a Dinosaur. Brook.
  - 18 ilium of a Dinosaur, of mammalian aspect. Brook.
  - 19 early caudal vertebra, ? Iguanodon. Brook.
- 
- 20 large part of an Emydian plastron, apparently of a new *Platemys*. Tilgate.
-

## CHELONIA

FROM THE PURBECK SERIES OF SWANAGE,  
IN THE ISLE OF PURBECK.

Exhibited on Shelves in the First Compartment on the  
South side in the West Room.

1 *Pleurosternon Sedgwicki*.

Perfect carapace, nuchal plate very slightly emarginate. Length  $18\frac{1}{2}$  inches, breadth  $15\frac{1}{2}$  inches; resembles in aspect *Pleurosternon ovatum*, but is shorter and broader. The first neural plate subdivided, as in *Pleurosternon concinnum* and *P. emarginatum*, with posterior impression of the first vertebral scute passing over the posterior part of the anterior subdivision. The second neural plate is narrow and four-sided. The eighth neural plate is  $\frac{3}{4}$  of an inch long, and the ninth, which widens behind, is  $1\frac{1}{2}$  inch long. The third, fifth, and ninth neural plates are crossed by vertebral scutes, as in *Pleurosternon emarginatum*. The first vertebral scute is narrower than the second and third, which are of equal width. The other characters approximate it to the species *P. emarginatum* and *P. ovatum*. The marginal plates are much broader than in the former species, and display no trace of the posterior emargination. The surface ornament is of the usual kind in *Pleurosternon*.

2 *Pleurosternon Vansittarti*.

Perfect carapace; presented by Augustus Arthur Vansittart, Esq. It resembles in aspect *Pleurosternon emarginatum*, but is broader in front. Length  $19\frac{3}{8}$  inches, breadth  $17\frac{1}{8}$  inches. The marginal plates and scutes are very broad. As in *Pleurosternon ovatum* and *P. lati-*

scutum, the first neural plate is not divided. The impressions of the vertebral scutes pass over the first, third, fifth, ninth, and tenth neural plates, as in *Pleurosternon emarginatum* and *P. Sedgwicki*. The costal scutes are very narrow, the second being 4 inches long and  $2\frac{1}{2}$  inches wide, and the fourth scute is very small. It is readily distinguished from *Pleurosternon emarginatum*, the only species with which it could be confounded, by the absence of the emargination, the undivided first neural plate and the broad marginal plates.

3 *Pleurosternon* Oweni.

This carapace has lost the nuchal and most of the marginal plates. Length from pygal plate to anterior margin of the first neural plate (which is undivided) 19 inches, breadth over the third costal plates  $14\frac{1}{2}$  inches; from which the perfect specimen may be presumed to have measured 22 inches by 17 inches, and to have had much of the form of *Pleurosternon ovatum*, being relatively almost as narrow.

The carapace appears to have been more than usually convex, for, though it is now more convex than any other specimen, the costal plates have all parted from each other at their marginal borders from compression. The first vertebral scute is half an inch narrower than the second.

It is readily distinguished from *Pleurosternon ovatum* by the marginal scutes extending far on to the costal plates, while in that species they are almost coincident with the marginal suture. The costal scutes are relatively narrow. The eighth neural plate is very small and quadrate, and only half the length of the ninth plate.

4 *Pleurosternon* typocardium.

Perfect carapace, with deep and wide nuchal emargination and well-marked pygal emargination. Length along the neural plates  $11\frac{1}{2}$  inches, breadth over the region of the fourth costal plates  $11\frac{1}{2}$  inches. It differs from all other species in having the sutures between the



scutes raised instead of excavated in the bone. They cross the 1st, 3rd, 5th, and 8th neural and apparently the pygal plate. It is gently convex and has the outer border of the anterior marginal plates more than usually turned up. There is a nuchal scute. The first vertebral scute is about half as long as the second, but as wide. The vertebral scutes are narrow, being narrower than the costal scutes, which are unusually large and encroach upon the marginal plates. It approximates to *Pleurosternon latiscutum* (Owen), which is the only other species with a nuchal scute, but is readily distinguished by the proportions of the vertebral and costal scutes.

- 5 impression of the interior of sternal plates of a ? *Pleurosternon*.

As the bones are gone, and have left sutural markings scarcely to be distinguished from the cracks, it is not very evident whether the intercalated bones of the plastron in *Pleurosternon* are present.

- 6 two portions of carapace of *Pleurosternon typocardium*.  
 7 marginal and costal plates of *Pleurosternon*.  
 8 costal plate of *Pleurosternon*.  
 9 costal plate of *Pleurosternon*.  
 10 hyposternal half of the plastron of *Pleurosternon*, showing the intercalated plates.

It approximates towards the species *P. emarginatum*, but appears to be distinct.

- 11 interior of hyposternal plate of *Pleurosternon*.  
 12 interior of hyposternal plate of *Pleurosternon*.  
 13 scapula of a small Emydian, probably *Pleurosternon*.

The remainder of the Purbeck Reptiles are in Cabinet LXXXII. b. They comprise a portion of the head of *Macellodus Brodiei* (Owen) and the impression of its lower jaw; and a scute of a *Crocodyle*, probably *Goniopholis*.

In the same Cabinet are the lower jaw and caudal vertebra of *Pterodactylus macrurus*, and a phalange of a small *Pterodactyle*.

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## ORNITHOSAURIA

FROM THE PURBECK SERIES, NEAR SWANAGE.

Exhibited in Cabinet LXXXII., Shelves a and b.

Case.	Shelf.
82	a

On this shelf are temporarily placed the cervical vertebræ of a Whale (*Palæocetus* Sedgwicki, Seeley) reputed to be from the Kimeridge Clay of Ely.

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 PTERODACTYLUS MACHURUS.

- a lower jaw of a Pterodactyle, from Langton, near Swanage, presumed to belong to the same animal as the vertebra 82.b.4. The specimen is slightly imperfect in front, and the rami do not extend so far as the articulation behind. So much as is preserved measures in length  $12\frac{1}{4}$  inches; and where fractured behind, the rami measure  $2\frac{1}{4}$  inches from side to side. The symphysis is 5 inches long, at its anterior termination the jaw expanding a little is nearly  $\frac{3}{4}$  of an inch wide; at the termination of the symphysis behind it is an inch wide. The rami are marked in the anchylosed part by a deep palatal groove. Behind the symphysis the rami narrow from side to side. The teeth were very small, have all fallen from their sockets and extended on

Case.	Shelf.	Specimen.
82	a	each side along at least 8 inches of the jaw; in the middle of the jaw there appear to be 7 teeth in the space of an inch.
82	b	<p>4 caudal vertebra of <i>Pterodactylus macrurus</i>, from Langton, near Swanage. Purbeck beds. This vertebra is 5 inches long, and conforms in general structure to the plan of caudal vertebrae of the Ornithosaurians from the Cambridge Greensand, differing chiefly in being narrower at the articular ends. The largest caudal vertebra hitherto known is <math>1\frac{1}{2}</math> inch long, figured by Prof. Owen in his account of <i>Pterodactylus simus</i>.</p> <p>5 phalange of wing finger of a small <i>Pterodactyle</i> from the middle Purbeck of Durlstone bay. Presented by Rev. O. Fisher.</p>

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## PLESIOSAURIA

## FROM THE PORTLAND SERIES.

Exhibited on Shelf **b** of Cabinet LXXXII.

Case.	Shelf	No.	
82	b	1	late dorsal vertebra of a small Plesiosaur or Pliosaur from the Portland stone of Whitmore, near Weymouth.
	b	2	worn shaft of ? femur which has lost its epiphyses. Upway Hill, near Weymouth, Portland stone.
	b	3	? humerus of Pliosaurus from Upway Hill. On the distal end is a cast of Lucina. Portland stone.

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## CROCODILIA\*

FROM THE KIMERIDGE CLAY, CHIEFLY OF ELY.

Exhibited in Cabinet LXXXII., Shelves c, d, e, f.

Cas.	Shelf.	Specimen.	
82	c	1	four dorsal vertebræ of a small ? <i>Dakosaurus</i> † from the Kimeridge Clay of Cottenham. The vertebræ are biconcave, with the margin of the centrum adjoining the intervertebral cup wrinkled.

Associated bones of *Dakosaurus* *lissocephalus* from Ely.

A smaller and probably immature example of the same species.

c	2	two cervical, one dorsal, and one caudal vertebræ.
c	3	nine fragments of dorsal and cervical ribs.
c	4	posterior dorsal vertebra.
c	5	?scapula.
c	6	?coracoid.
c	7	an undetermined sub-quadrate bone.
c	8	fragments of right and left premaxillary bones.
c	9	left nasal bone and five fragments of jaw.
c	10	five fragments of jaw bones.
c	11	frontal bone.
c	12	heel of mandible.

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d	1	skull of <i>Dakosaurus</i> <i>lissocephalus</i> from the Kimeridge Clay of Ely. It displays ex-occipital, supra-occipital, squamosal, quadrate, quadrato-jugal, epiotic, alisphenoid, parietal, frontal, post-frontal, malar, pre-frontal, and nasal bones.
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If the vertebræ in the series c. 2—12 are parts of the same animal with the head-bones, then to this individual must have belonged vertebræ like the series c. 1. The external

\* It may be doubtful whether the term *Crocodilia* can be so far extended as to include the transitional group to which these remains belong. The *Teleosauria* have strong affinities with *Plesiosaurs* and *Dinosaurs*.

† The generic distinction between *Dakosaurus* and *Stenoeosaurus* remains to be established. The form of the skull in these specimens is that of Cuvier's *Crocodile*, 'Tête à museau plus allongé.' The specimens in the Oxford Museum which are referred to *Stenoeosaurus* have the same form of skull.

Cass.	Shelf.	Specimen.
82	<i>d</i>	surface of all the cranial bones preserved is smooth. The frontal bone is shaped like an arrow-head, with the lateral barbs extending backward and outward to meet the post-frontal, which with the malar, quadrato-jugal, squamosal, supra-occipital and parietal enclose on each side the long sub-triangular temporal fossa broad behind. The part of the frontal which runs back like the haft of an arrow-head is narrow and flattened with parallel sides.
	<i>d</i>	2 portion of maxillary bones, probably of <i>Dakosaurus</i> , from the Kimeridge Clay of Cottenham. Presented by Rev. S. Banks.
	<i>d</i>	3 anterior end of mandible of a large <i>Dakosaurus</i> from the Drift of Bourne.
	<i>e</i>	1 left scapula of <i>Dakosaurus</i> from Ely.
	<i>e</i>	2 right scapula of <i>Dakosaurus</i> from Ely.
	<i>e</i>	3 five large teeth of <i>Dakosaurus</i> from Ely.
	<i>e</i>	4 lumbar vertebra of a Crocodilian from Ely.
	<i>e</i>	5 two early dorsal vertebræ of a small <i>Dakosaurus</i> from Ely. Presented by W. Marshall, Esq.
	<i>e</i>	6 two dorsal and a caudal vertebræ of a small <i>Dakosaurus</i> from Stretham.
	<i>e</i>	7 dorsal vertebra of a large <i>Dakosaurus</i> from near Ely.
	<i>f</i>	1 femur of <i>Dakosaurus</i> from Ely.
	<i>f</i>	2 four dorsal vertebræ of <i>Dakosaurus</i> from Ely.
	<i>f</i>	3 four caudal vertebræ of <i>Dakosaurus</i> from Ely.
	<i>f</i>	4 dorsal vertebra of ? <i>Dakosaurus</i> from Ely.
	<i>f</i>	5 caudal vertebra of <i>Dakosaurus</i> from Ely.
	<i>f</i>	6 proximal end of femur of a Crocodilian distinct from <i>f</i> . 1, probably <i>Dakosaurus</i> , from Downham Market.

On Shelf *g* is temporarily placed the right femur of a Dinosaur from the Oxford Clay, *Cryptosaurus eumerus*.

On Shelf *h* are placed six vertebræ, probably of *Plesiosaurus*.

## GIGANTOSAURUS MEGALONYX,

A TERRESTRIAL REPTILE,

FROM THE KIMERIDGE CLAY.

Exhibited on Shelf a of Cabinet LXXXIV., and over  
Cabinet LXXXII.

These bones were found at different times in different localities. They are the only remains from the Kimeridge Clay of the Ely district which are not referable either to Ichthyosauria, Plesiosauria, Crocodilia, or Chelonia. And as the bones are such as might pertain to one animal, the genus Gigantosaurus is constituted to receive them.

Cas.	Shelf.	No.	
84	a	1	centrum of ? cervical vertebra, very slightly concave in front and very slightly convex behind; it hangs a little forward, like a Pliosaur. The intervertebral articular surface is $8\frac{1}{2}$ inches deep, and appears to have been as wide, and circular: in part the posterior surface is rugose and pitted as with small-pox. The neural arch was supported on short pedicles, between which is a narrow neural canal. Below the pedicles is on each side a large impressed facet for the rib, subdivided by a transverse ridge into a small upper part and a large lower part. Below the ribs are deep large holes, two smaller ones in front and a larger one behind*, which penetrate far into centrum and are lined with smooth bone surface as far as excavated. They have the aspect and the position of air-cells,

\* In the absence of the usual aids, the front and back determinations are conjectural.

Case.	Shelf.	No.
84	a	

but the bone is dense. On the ventral and neural surfaces are many considerable perforations for nutritive vessels. The ventral surface is concave from front to back and convex from side to side. From front to back it measures  $4\frac{1}{2}$  inches. From Stretham. Presented by Rev. S. Banks.

a        2    caudal vertebra from Cottenham. Presented by Rev. S. Banks. It is hour-glass shaped; 6 inches long, with the intervertebral surfaces very slightly concave,  $3\frac{3}{4}$  inches high, 4 inches wide.

a        3, 4   two casts of a claw-phalange from Ely, much compressed from side to side, with the articular surface rugose and convex from side to side. 4 inches high, and 2 inches wide; and  $5\frac{1}{2}$  inches long at the base.

a        5    a dermal plate from Cottenham, presented by Rev. S. Banks. It has the form of the side plates of a Teleosaurian, with a truncating sutural surface at each end, and it is compressed to a sharp border at the back and in front. The outer half of the upper surface is pitted with large holes, like those on scutes of Crocodiles. It is more likely to have belonged to Dakosaurus, but may have pertained to this genus.

Over Cabinet LXXXII. are a cast of the fibula, and the proximal end of the tibia; both are solid bones. The fibula is 27 inches long, somewhat flattened, curved a little towards the tibia, and expanded laterally at the articular ends, which are rugose; proximal end reniform, distal end long ovate.

The portion of tibia preserved is 17 inches long, gives off a sort of patelloid prominence, measures 9 inches in one direction and  $5\frac{1}{2}$  in the other over the rugose sub-rhomboid flattened articular end.



## PLESIOSAURIA

FROM THE KIMERIDGE CLAY, CHIEFLY FROM NEAR ELY.

Exhibited in Cabinets LXXXIV.—LXXXV.

## CABINET LXXXIV.

## PLIOSAURUS.

Case.	Shelf.	Specimen.	
84	<i>b</i>	1—7	ribs of Pliosaurus.
	<i>b</i>	8	first dorsal of Pliosaurus brachyspondylus (Owen), sawn in halves to show osseous structure.
	<i>b</i>	9	dorsal vertebra of Pliosaurus brachyspondylus.
<hr/>			
	<i>c</i>	1	large flattened rib.
	<i>c</i>	2	anterior end of mandible of a sharp-nosed ?Pliosaurus, from Haddenham.
	<i>c</i>	3	articular end of mandible of ?Pliosaurus, from Haddenham. ( <i>c.</i> 1, 2 and 3 presented by J. W. Clark, Esq. M.A.)
	<i>c</i>	4, 5	9 carpal or tarsal bones of a ?Pliosaurus, from Ely.
<hr/>			
	<i>d</i>	1	fragment of jaw-bone, showing grooves for teeth.
	<i>d</i>	2	larger fragment of jaw-bone and two crushed teeth of Pliosaurus, from Ely.
	<i>d</i>	3	six teeth of Pliosaurus.
	<i>d</i>	4	a large and typical tooth of Pliosaurus.

Case.	Shelf.	Tablet.	
84	d	5	two teeth of Pliosaurus with circular crowns, from the back of the jaw.
	d	6	tooth of Pliosaurus in which the ridges are obliterated.
	d	7	tooth of Pliosaurus with the ridges very strong.
	d	8	two teeth of Pliosaurus with the area usually flattened here convex, and the ridges narrow, wavy, and few; new species.
<hr/>			
	e	1	early cervical vertebræ of Pliosaurus, showing
		2	the double confluent tubercle for the rib at the base of the side of the centrum.
		3	
	e	4	late cervical vertebra of Pliosaurus.
	e	5	late cervical vertebra of Pliosaurus brachyspondylus, showing on the left side two tubercles for the rib and on the right side one large tubercle: associated with the thirty vertebræ over Cabinets LXXXII.—LXXXIV.
	e	6	pectoral vertebra of Pliosaurus, a little crushed.
	e	7	early dorsal of Pliosaurus brachyspondylus.
	e	8, 9	dorsal vertebræ of Pliosaur.
	e	10	neural arch, probably of a Pliosaurus vertebra.
<hr/>			
	f	1	pectoral vertebra of Pliosaurus.
	f	2—6	early dorsal vertebræ of Pliosaurus; they overhang each other in front.
<hr/>			
	g	1	four phalanges.
	g	2	6 phalanges. { These bones appear to be associated with the series c. 4, and c. 5.
	g	3	

## CASE LXXXV.

## Genus PLESIOSAURUS.

Case.	Shelf.	Tablet.	
85	a	1	right coracoid. { Plesiosaurus megadeirus. Ely.
	a	2	left coracoid. { Associated with specimen presented by Stead Jones, Esq.

Case.	Shelf.	Tablet.	
85	<i>a</i>	3	right coracoid. } Plesiosaurus. Ely.
	<i>a</i>	4	left coracoid. }
	<i>a</i>	5	right coracoid. } Plesiosaurus. Ely.
	<i>a</i>	6	left coracoid. }
85	<i>b</i>	1	cervical vertebra of a long-necked Plesiosaur. Ely.
	<i>b</i>	2	{ three associated cervical vertebræ of a long-necked Plesiosaur, with flattened intervertebral surfaces. From Downham Market.
	<i>b</i>	3	
	<i>b</i>	4	
	<i>b</i>	5	pectoral vertebra. }
	<i>b</i>	6	dorsal vertebra. } Plesiosaurus. Ely.
	<i>b</i>	7	dorsal vertebra. }
	<i>b</i>	8	dorsal vertebra, with neural arch anchylosed.
	<i>b</i>	9	late dorsal vertebra.
	<i>b</i>	10	early caudal vertebra. Witcham.

85	<i>c</i>	1	girdling shaft of a femur from which both epiphyses have come away.
	<i>c</i>	2	ilium.
	<i>c</i>	3	fragments of right and left os pubis.
	<i>c</i>	4	right ischium.

The foregoing, *c.* 1—4, are from Cottenham, and associated.

Presented by Rev. S. Banks.

- 5 left ischium. Ely.
- 6 os pubis. Ely.
- 7 os pubis. Ely.
- 8 cervical vertebra. Near Ely.

85	<i>d</i>	1	os pubis, imperfect. Cottenham. Presented by Rev. S. Banks.
	<i>d</i>	2	phalange. Ely.
		3	phalange, probably of Pliosaurus.
		4	two early dorsal vertebræ of a small Plesiosaur, with flattened articular face to the centrum.

The next 7 specimens are from Ely and associated. They indicate a well-defined new species, *Plesiosaurus sterrodeirus*.

- d* 5 a large basi-occipital bone, like that of *Ichthyosaurus*.

Case.	Shelf.	Tablet.	
85	d	6	two early cervical vertebræ, short from front to back, with the centrum flattened.
		7	two later cervical vertebræ; the progressive elongation of the vertebræ in backward succession, as in Pliosaurus, should be noticed.
		8	pectoral vertebra, with the centrum cupped.
		9	pectoral or dorsal vertebra.

The next 7 specimens are associated. From Cottenham. Presented by Rev. S. Banks.

d	10	dorsal vertebra of Plesiosaurus, with neural arch.
e	1—6	dorsal vertebræ of Plesiosaurus, with their neural arches anchylosed.

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f	1	dorsal vertebra of a large ? Plesiosaur. Ely.
f	2	femur. } Pliosaurus. Ely.
f	3	? humerus. }
f	4	femur.
f	5	femur, ? Plesiosaur.

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#### CASE LXXXII. Shelf h.

82	h	1	dorsal vertebra of a Plesiosaur or Teleosauroid crocodilian, with unusually elongated centrum flattened at both ends. Presented by O. Salvin, Esq.
	h	2	caudal vertebra, probably of an unknown Plesiosaurian, with large articular facets on the base of the centrum, not reaching so far back as the intervertebral margin.
	h	3	dorsal vertebra of a Plesiosaur, with elongated flattened centrum, and the processes for the ribs directed upward at a great angle.
	h	4	cervical vertebra, in excellent preservation, with flattened intervertebral surface and rugose margins.
	h	5	two cervical vertebræ similar to h.4.

## REPTILES FROM THE KIMERIDGE CLAY.

Arranged over Cases LXXXII.—LXXXVIII.

? proximal end of tibia of *Gigantosaurus*.

? cast of fibula of *Gigantosaurus*.

three caudal vertebræ, and a cast of a larger caudal vertebra of *Cetiosaurus*. ? Locality.

1—33 dorsal vertebræ of *Pliosaurus brachyspondylus* (Owen), from Roswell Pit, near Ely. Reputed associated. 1 and 2 are on Shelf e, Case 84.

1—41 vertebræ of *Ichthyosaurus*, from the Kimeridge Clay of Ely: 1—8 dorsal, the remainder caudal. proximal end of humerus of a large *Pliosaur*. dorsal vertebra of a large *Pliosaur*.

right and left quadrate bones of a *Pliosaur*.

In the lower room (South side Compartment 8) are parts of the frontal and nasal bones of the same *Pliosaur*.

humerus and femur and other paddle bones of a *Plesiosaurus megadeirus*, mounted on board. They were associated with the series of 56 cervical and dorsal vertebræ mounted on a stand in Compartment A of the Lecture-room, and with the coracoid bones in Case 85. a. 1, 2. All are from Ely, and presented by Stead Jones, Esq.

a femur of *Plesiosaur*.

six vertebræ of *Pliosaurus* or *Polyptychodon* without locality.

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Arranged over Cases v.—viii. are  
12 dorsal vertebræ of Pliosaurus.  
small femur of Plesiosaurus.

Arranged over Cases ix.—x.  
humerus or femur of Pliosaurus from Aylesbury. Presented by  
Rev. C. Erle.  
distal end of a large ?femur of Pliosaurus from Roswell Pit.  
Presented by Rev. Richard Taylor.  
?humerus of Pliosaur.

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The other Plesiosaurian remains from the Kimeridge Clay are an almost perfect vertebral column of a new species *Plesiosaurus megadeirus*, from Haddenham, in the Lower Room; presented by Rev. S. Banks. The vertebral column of the specimen presented by Stead Jones, Esq., in Compartment A. of the Lecture-room; and some bones of *Plesiosaurus* and *Pliosaurus* arranged in Cabinet D in the Lecture-room.

NOTE ON THE VERTEBRÆ OF TWO SPECIES OF  
PLIOSAURUS.

## PLIOSAURUS BRACHYSPONDYLUS.

IN his additional notes on Ichthyosaurus and Plesiosaurus, Vol. I. Series 2, *Transactions of the Geological Society*, Mr Conybeare figured certain vertebræ (pl. 22) three inches in diameter, which in his paper on Plesiosaurus dolichodeirus were referred to the Market-Raisin fossil at Oxford, and named *P. giganteus*. Mr Conybeare thus recognised it as a Pliosaur, but it probably ought not to have been referred to a species to which Prof. Owen's descriptions assign cervical vertebræ having a diameter of 5 or 6 inches.

Prof. Owen refers to the same vertebræ as evidence of his Plesiosaurus brachyspondylus, but they are Plesiosaur in that general sense only in which Pliosaur itself may be so named. The description is scanty, and the only character of importance mentioned is, that the "articular surface is very slightly concave, with a small round depression at the centre."

Of such vertebral bones there is in the Woodwardian Museum an associated series of 30, arranged over Cabinet LXXXIII.; and there are 7 more unassociated in Case LXXXIV., and except a cervical among the latter all are dorsal. There is one character in these and all other dorsal vertebræ of Pliosaurus from Ely very peculiar, in that from the neural arch being placed so far forward the upper part of the anterior articular surface of the centrum projects and hangs over the corresponding part of the posterior surface of the adjacent vertebra, which retreats; hence the whole vertebra is oblique and leans forward.

The first bone of the series of 30 is an early dorsal, its articular surfaces are 3 inches high and 3 inches wide and slightly ovate in outline vertically. Unlike Conybeare's figure, the peripheral margin is rounded. The articular surface is very nearly flat, though a little depressed in the central part, and at the centre there is a small conical pit, which a transverse section (Case 84. *b*. 8) shows to taper to a line which runs through the vertebra. Its thickness at the base is  $1\frac{3}{4}$  inch; length of the neural canal is  $1\frac{1}{8}$  inch; the thickness in the central pit is  $1\frac{1}{8}$  inch; the *height* from the middle of the base to the middle of the neural canal is  $2\frac{1}{8}$  inches. The articular surfaces are minutely punctate, and the outer surface concave from front to back. The neural canal  $1\frac{3}{8}$  in. broad behind; in the middle it is  $\frac{3}{8}$ . The extreme width across the centrum at the facets for the neuropophyses is  $3\frac{3}{4}$  inches; they are concave, transversely oval, and measure  $1\frac{3}{4}$  inch wide by  $1\frac{1}{2}$  inch long. There are 3 small foramina on each side. An earlier vertebra, seemingly the first dorsal, is only  $1\frac{1}{4}$  inch in length. The measurements vary a little with different specimens, but the proportions are preserved.

The last of the 30 dorsal centra shows no sign of being near the end of the back. It has the same shape of articular surface, but it has increased half an inch in width and  $\frac{5}{8}$ ths of an inch in height; its front to back thickness is a little less at the neural canal than at the base, where it is greatest and measures  $2\frac{5}{8}$ ths inches. The intervertebral surface is more decidedly concave than in the early dorsal.

The cervical vertebra, Case 84. *c*. 5, measures  $3\frac{1}{2}$  inches broad,  $2\frac{3}{4}$  inches high, and  $1\frac{1}{2}$  inch thick. The outline is transversely ovate, the articular surfaces are flattened with the characteristic central pit. The facet for the cervical rib adjoins that for the neuropophysis, being nearly 2 inches long and an inch wide.

In section the vertebræ show no sign of epiphyses. The texture is dense under the neural canal and round the outside. The cancellous structure is coarse in the centre, but finer near the articular surfaces.

The anterior zygapophyses are just below the upper boundary of the neural canal; the posterior zygapophyses are just above it, they are oval facets projecting  $\frac{3}{4}$  of an inch, with a little depression under them in the neural arch.



The reason for thinking this a good species is that many specimens have been found exactly of the same size, while there are no examples of sizes intermediate between this species and the next. The larger specimens almost invariably show a central prominence where this is concave, and differ a little in the proportions of the centrum.

PLIOSAURUS BRACHYDEIRUS.

Of this form the Museum contains but one neck vertebra, Case 84.f. 1, which, from the way the facets for the pleurapophyses adjoin those for the neurapophyses, appears to be the last cervical. It was obtained from the Kimeridge Clay of Cottenham, and presented to the University by the Rev. S. Banks. It has the same concave exterior and the same flattened ends, with a large elevated central boss an inch in diameter, between which and the peripheral margin the surface is concave. It is nearly 5 inches wide, nearly  $4\frac{1}{2}$  inches high, and nearly  $2\frac{3}{4}$  inches thick.

The sub-circular facets for cervical ribs are not on the surface of the centrum, as in *Pliosaurus brachyspondylus*, but on pedicles an inch long. From one pleural facet to the other it measures  $6\frac{1}{2}$  inches. The neural canal is 2 inches wide behind. Another cervical from nearer to the head has all the same characters, except that the bone is half an inch deeper. Of this species the collection contains 11 dorsal vertebræ in Case 84.f.

The largest has the articular surface circular and measures  $4\frac{3}{4}$  inches deep, and nearly 5 inches broad, and  $3\frac{1}{2}$  inches long.

The smallest dorsal has the articular surface vertically ovate and measures  $4\frac{1}{2}$  deep, and from side to side nearly 3 inches long at the base, and a little less at the neural canal. As in the other species, the bones show an anterior obliquity.

It is evident from Mr Conybeare's figures, pl. 22 (loc. cit.), that the cervical vertebræ of *Pliosaurus*, like those of *Plesiosaurus*, elongate as they near the back, and do not, as stated by Prof. Owen\*, maintain the same length. There is an anomaly in Prof. Owen's measurements, for, though stating that as the cervical vertebræ recede from the head they increase in breadth and depth

\* P. 63, Report on British Fossil Reptiles, Part II., 1841, *British Association Reports*.

(loc. cit.), the cervicals of *P. brachydeirus* are given a length of  $1\frac{1}{2}$  inch, breadth 5 inches, depth 6 inches; and yet the dorsals are 4 inches 3 lines broad, 4 inches deep, and 3 inches long.

Besides these there are in the Collection two anterior cervical vertebrae which appear to belong to a third species. (Case 84. c.) One is  $6\frac{1}{4}$  inches deep,  $6\frac{1}{4}$  inches broad,  $2\frac{1}{4}$  inches long. It has a double articulation for the rib, which is below the centre of the centrum. From one rib facet to the other it measures  $7\frac{5}{8}$  inches. The other centrum is 6 inches deep,  $6\frac{1}{4}$  inches broad, and  $2\frac{3}{4}$  long. In all other respects it is like the first one.

The most important parts of the skull preserved are the quadrate bones with the articulations for the lower jaw (over Cases 87 and 88). The more perfect of these fragments is 19 inches long and a foot wide. The quadrate of Plesiosaurs, Steneosaurs, and allied forms is a pedicle projecting backward, while in the Nothosaurs it is a pedicle projecting downward and united with the bones at the back of the skull, so that, by the union of the ex-occipital with the quadrate near the condyle, and of the parietal and squamosal bones above, a large foramen, which looks backwards, is made on each side of the occipital surface.

In Pliosaurus the quadrate bone is a slender style which unites with the bones of the back of the head exactly as in Nothosaurus, only with this difference, that the ex-occipitals encroach much more, and produce a smaller "quadrate foramen," judging from the form of the condyle and the general analogy to Nothosaur.

## ICHTHYOSAURIA

## FROM THE KIMERIDGE CLAY.

Index to the Remains of Ichthyosaurus from the Kimeridge  
Clay of the country near Ely.

Exhibited in Cabinet LXXXVI., Shelves a, b, c, d, e.

Case.	Shelf.	Specimen.	
86	a	1	19 teeth of Ichthyosaurus. Ely.
	a	2—6	three cervical and two caudal vertebræ of Ichthyosaurus, from Ely.
	a	7	early dorsal vertebra of Ichthyosaurus. Ely.
	a	8	early caudal vertebra of Ichthyosaurus. Ely.
	a	9	pelvic vertebra of Ichthyosaurus. Haddenham. Presented by W. Marshall, Esq.
	a	10, 11	caudal vertebræ of Ichthyosaurus. Chettisham*. Presented by W. Marshall, Esq.
	a	12	free unanchylosed axis vertebra of Ichthyosaurus, from Chettisham. Presented by W. Marshall, Esq. It may be named Ichthyosaurus chalarodeirus.
	<hr/>		
86	b	1	sclerotic plate of Ichthyosaurus. Cottenham.
	b	2	early cervical vertebra of Ichthyosaurus. Haddenham. Pres. by W. Marshall, Esq.
	b	3	axis vertebra of Ichthyosaurus, free. Strettham. This species is distinct from a. 12. Ichthyosaurus hygrodeirus.

\* The specimens from Chettisham were all obtained at one time.

Case.	Shelf.	Specimen.
	<i>b</i>	4, 5 two cervical vertebræ. Stretham and Ely.
	<i>b</i>	6, 7 late dorsal and lower dorsal vertebræ of Ichthyosaurus. Ely.
	<i>b</i>	8 late dorsal vertebra. Chettisham.
<hr/>		
86	<i>c</i>	1 caudal vertebra of Ichthyosaurus. Ely.
	<i>c</i>	2 early caudal vertebra of Ichthyosaurus. Ely.
	<i>c</i>	3 late dorsal vertebra of Ichthyosaurus. Ely.
	<i>c</i>	4 mid-dorsal vertebra of Ichthyosaurus. Ely.
	<i>c</i>	5 early mid-dorsal vertebra of Ichthyosaurus. Ely.
	<i>c</i>	6 mid-dorsal vertebra.
<hr/>		
86	<i>d</i>	1 late dorsal vertebra.
	<i>d</i>	2 late dorsal vertebra.
	<i>d</i>	3 late dorsal vertebra.
	<i>d</i>	4 mid-dorsal vertebra.
<hr/>		
86	<i>e</i>	1 left humerus of Ichthyosaurus. Chettisham. Presented by W. Marshall, Esq.
	<i>e</i>	2 left humerus of Ichthyosaurus of a distinct species from <i>e.1.</i> Chettisham. Presented by W. Marshall, Esq.
	<i>e</i>	3 well preserved basi-sphenoid of Ichthyosaurus. Chettisham. Pres. by W. Marshall, Esq.
	<i>e</i>	4 corresponding basi-occipital of Ichthyosaurus. Chettisham. Pres. by W. Marshall, Esq.
	<i>e</i>	5 fragment of jaws of an Ichthyosaurus. Ely.
	<i>e</i>	6 left scapula of Ichthyosaurus. Ely.

## CHELONIA

FROM THE KIMERIDGE CLAY.

## ENALIOCHELYS CHELONIA.

Cass.	Shelf.	
86	<i>f</i>	remains of a Chelonian from Ely, mounted on a large board, comprising 9 neural plates, 12 costal plates, scapula, right and left coracoid, humerus, ischium, 5 caudal vertebræ, neural arch of cervical vertebra, two marginal plates, right and left tibiæ and fibulæ, 4 phalanges indicative of terminal claws, 10 fragments, chiefly of marginal plates and plastron.

Under *f* are other fragments found with these.

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This remarkable Chelonian presents many affinities. The scapula-arch is similar to that of the land Tortoises; the humerus is very peculiar, but suggestive of Emydian affinities; the tail is long, and suggests Chelydra, there are no chevron bones; the carapace is impressed with scutes, but considerable intervals were left between the costal and marginal plates, as in the marine Chelonians; the plastron was imperfectly developed.

It appears to have been one of those lost forms which connect the now aberrant *Sphargis* with its allies Trionyx and Emys.

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## REPTILIA

FROM THE CORAL RAG AND ITS CLAY-EQUIVALENT  
[AMPTHILL CLAY].

IN Buckinghamshire, Bedfordshire, Cambridgeshire and other parts of England the Coral Rag as a Limestone disappears, and is replaced by a Clay which is well seen in the cuttings on the Bedford and Luton Railway near Ampthill, where the Oxford and Kimeridge Clays are displayed below and above the Ampthill Clay.

Case.	Comp.	Drawer.	Tablet.	
J	b	2	19	basi-occipital bone of Ichthyosaurus. Ampthill.
			20	cervical vertebræ, probably of a Stenoe- saurus. Ampthill.
			21—22	teeth of Pliosaurus. Coral Rag. North Grimston.
			23	worn tooth of Pliosaurus. Coral Rag. North Grimston.
			24	worn tooth of Dakosaurus (new sp.). Coral Rag. North Grimston.
			25	caudal vertebra of a reptile (new). Malton.

In this Drawer are the Reptiles from the Great Oolite.

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## ICHTHYOSAURIA

FROM THE OXFORD CLAY OF PETERBOROUGH.

Exhibited in Cabinets I. and II.

THE fossils in Case I. and shelves *a* and *b*, Case II. are the bones of one Ichthyosaurus from Woodstone Lodge near Peterborough, and a portion of the Collection formed by the late Dr Henry Porter. They comprise on Case I. *a* and I. *b* separate bones of the head, and on the remaining shelves of Case I. vertebræ, of which the atlas and axis were anchylosed; there was an inferior wedge-bone, which was not anchylosed. These are followed by 24 other cervical vertebræ, in which the centrum gradually enlarges in passing backward, and in which the upper head for the rib was entirely supported on the neural arch in all except the last. With this character in all known animals is associated a four-celled heart. The neck vertebræ are about twice the usual number. Twenty-three vertebræ, progressively enlarging, have gradually descending down the side of the centrum the double tubercle for the double-headed rib. Then come 32 caudal vertebræ, decreasing in size, with a single tubercle for the rib, at the base of the side of the centrum, and these are succeeded by 14 terminal caudal vertebræ, which do not support ribs, and continue to diminish in size.

On shelf *a* Case II. are placed the right and left coracoids, right and left scapulæ, left humerus, right and left femora, hyoid and carpal or tarsal bones. On shelf *b* are ribs.

The species, which is new, may be named *Ichthyosaurus megalodeirus*.

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CABINET I.

Case.	Shelf.	Specimen.	
I	<i>a</i>	1—12	dentary bones and other elongated head-bones.
	<i>b</i>	1	back part of the skull crushed, showing the upper half of the eye, defended with large thin sclerotic plates. It apparently shows the post-frontal above, the supra-quadrata, and the quadrata bones behind. On the under side is seen the basi-sphenoid, badly preserved, and a bone under the eye-hole, presumed to be the articular element of the lower jaw.
	<i>b</i>	2—3	other bones of the head anterior to these. They comprise the premaxillary, showing the anterior boundary of the exterior nares and extending nearly to the end of the snout; the maxillary, the lachrymal, part of the nasal, and the malar forming the anterior border of the orbit.
	<i>b</i>	4	right premaxillary.
	<i>b</i>	5	right nasal bone.
	<i>b</i>	6	right malar bone.
	<i>b</i>	7	? frontal.
	<i>b</i>	8	undetermined.
	<hr/>		
	<i>c</i>	1	anchylosed atlas and axis and third cervical.
		2	four succeeding cervicals, the last two with their neural arches preserved and shifted to the side of the specimen. The neuropophyses are broad and the zygapophyses long and oblique, looking forward upward and inward, and it results that the passage for the inter-



Case. Shelf. Specimen.

- I    *c*                      vertebral nerve is not large. After the third all the cervical vertebræ have the ventral side rounded, and differ from each other chiefly in size.
- 3—21    cervical vertebræ, in which the only noticeable change is, that the pit for the neurapophysis comes to look more and more outward.
- 
- I    *d*                      1    the last cervical or pectoral vertebræ, and the first dorsal. In the former the upper head for the rib will be seen to be partly on the centrum, while in the succeeding vertebræ both tubercles are for the first time entirely on the centrum.
- d*                      2    four early dorsal vertebræ, showing the rapid descent of the upper tubercle for the rib down the side of the centrum.
- d*                      3—5    early dorsal, the ventral part of the centrum between the tubercles still convex from side to side.
- d*                      6—17    mid and late dorsal, in which the outline of the centrum becomes sub-hexagonal, the ventral surface flattened, and the approximating tubercles are at the base of the side.
- 
- I    *e*                      1    late dorsal.
- 2    last dorsal; on one side the rib-tubercles are distinct, on the other side they are welded into one oblique tubercle directed downward and forward.
- e*                      3—18    early caudal, differing but little in characters, though the later vertebræ have the centrum a little smaller, and the early vertebræ have the tubercle for the rib elongated instead of ovate. In outline they are sub-quadrate with the corners taken off.
- 
- f*                      1—3    early caudal.
- 4—12    late caudal; more quadrate in outline, with the intervertebral cup less deep than in the

Case. Shelf. Specimen.

I f

early caudal vertebræ, with concentric ridges of a somewhat cetacean aspect. The articulation for the rib is a groove which extends from the front to the back margin. These vertebræ steadily decrease in size.

13—19 later caudal vertebræ with convex margins, rapidly diminishing in size. They recall the aspect of late caudal vertebræ among cetaceans, and are identical in form with the bones from the Cambridge Greensand which were supposed to belong to whales [Lyell, *Sup. Elements*, 1859]. The rib is last seen on f 15, the 81st vertebra of this series.

20—30 These terminal caudal vertebræ are without ribs, and have the intervertebral surface only slightly impressed in the centre, are much elongated from back to front and compressed from side to side. They rather resemble the dorsal vertebræ of a Plesiosaurus than any other Ichthyosaurian bones. f 30, the 96th vertebra preserved, is about half an inch in diameter, and must have been nearly the last.

## CABINET II.

- |    |   |   |  |   |
|----|---|---|--|---|
| II | a | 1 | right coracoid,  | } Much expanded, so that together they measure nearly 16 inches from side to side. The articulation for the scapula is unusually extended. The posterior emargination is deep. a 2 displays ribs on its under side. |
|    | a | 2 | left coracoid.   |   |
|    |   | 3 | left scapula,  | } Unusually expanded at the humeral end, and unusually broad from side to side. a 4 shows ribs on its under side.   |
|    |   | 4 | right scapula.   |   |
|    |   | 5 | left humerus, rather crushed at the proximal end; distal end expanded. |   |

Case.	Shelf.	Specimen.	
II	c	6—18	phalange bones, rounded at their adjacent margins, with irregular surface, as though separated by cartilaginous substance.
		19—21	parts of the hyoid arch.
		22—23	right and left femora. The femur is about two thirds of the length of the humerus.
		24	undetermined.
<hr/>			
	b	1—16	fragments of ribs, some nearly entire. They show the double head and the longitudinal groove characteristic of the genus.
<hr/>			
II	c		On this shelf is an associated series of vertebræ of a new species of <i>Ichthyosaurus</i> from near Peterborough (Porter Collection).
		1—11	are cervicals, with the upper head for the rib partly on the neurapophysis. c 9 is uncompressed and shows the tubercles for the ribs to be close together, indicating a different species from <i>Ichthyosaurus dolichodeirus</i> . c 15 is also cervical.
		12—14	are very early dorsal, the upper head for the
		16	rib barely upon the centrum.
		17—19	mid dorsal, with both heads for the rib in the middle of the side of the centrum.
		20—30	late dorsal, both tubercles for the ribs on the lower part of the side of the centrum; the upper head unusually small. The centrum has the usual sub-trapezoidal form.
		31—32	may be considered as sacral; on one side the rib heads are confluent, on the other side they have blended into an oblong tubercle, which instead of being oblique is vertical.
		33—45	centrum sub-hexagonal, with a single rib-head, early caudal.
		46—54	late caudal centrum, becoming sub-quadrate; articulation for rib extending across the centrum from back to front.

Case.	Shelf.	Specimen.
II	<i>d</i>	On <i>d</i> , <i>e</i> , <i>f</i> are placed vertebræ and other bones of Ichthyosaurus. The vertebræ are so small compared with the limb bones on shelf <i>f</i> as to make it improbable that they could have belonged to the same animal.
	<i>d</i>	1 basi-sphenoid bone.
		2 anchylosed atlas and axis.
		3—18 cervical vertebræ.
		19—20 dorsal vertebræ.
II	<i>e</i>	1—13 early caudal vertebræ.
		14—24 late caudal, at first triangular, and then unusually expanded from side to side.
II	<i>f</i>	1—2 ribs.
		3 vertebra.
		4 proximal end of left scapula, well preserved.
		5 proximal end of right scapula.
		6 right coracoid.
		7 left humerus.
		8 right humerus.
		9 ?left femur.
		10—28 phalange bones, rounded and apparently separated by cartilage.

## PLESIOSAURIA

## FROM THE OXFORD CLAY.

Exhibited in Cabinet III.

Case.	Shelf.	Specimen.
III		On <i>a, b, c</i> are the remains of a <i>Pliosaurus</i> from the Oxford Clay of St Neots. In the Lecture-room, between Compartments B and C, is an os pubis of the same animal. They were collected and presented by J. J. Evans, Esq., and may be named after the discoverer, <i>Pliosaurus Evansi</i> .
	<i>a</i>	1—4 fragments of ribs. 5—9 neural arches of vertebrae. 10 coracoid; it is two feet long, and thirteen inches broad at the glenoid cavity.
III	<i>b</i>	1 atlas and axis, apparently not anchylosed; there is a large subvertebral wedge bone which does not appear to be anchylosed; and the lateral elements of the atlantal cup are lost with the neural arches. Each centrum is an inch and a half long from back to front, 3 inches wide from side to side, and $2\frac{1}{4}$ high from the neural to the hæmal surface. The second vertebra has a large tubercle for a rib at the base of the side of the centrum. The second wedge bone is lost.

Case.	Shelf.	Specimen.	
III	b	2—14	cervical vertebræ, gradually elongating and enlarging as they pass backward. The 20th vertebra is 2 inches long, 3 inches deep and $4\frac{1}{2}$ inches wide. The intervertebral surface is slightly depressed, sometimes with a minute central pit. The tubercle for the rib is very large and elevated, and subdivided into an upper and an under part from the third to the fifteenth vertebra. It gradually ascends the side of the vertebra till in the twentieth, which may be considered the first pectoral, it is partly on the neural arch. With the ascent of the tubercle the mesial ridge on the hæmal side of the centrum disappears.
III	c	1—16	vertebræ 21st to 35th are dorsal.
	c	1	may be considered pectoral, the rib being still partly supported on the centrum.
	c	2	measures $2\frac{1}{4}$ inches from back to front.
		13	measures $2\frac{3}{4}$ inches from back to front; $3\frac{1}{4}$ inches high and $3\frac{3}{4}$ inches wide. The intervertebral surface is flattened, nearly circular in outline, and hangs a little forward as in Kimeridge clay Pliosaurus.
III	d		On this shelf are placed remains of the skull probably of a Pliosaurus from Lattenbury Hill near Huntingdon, presented by Arthur Sperling, Esq. There are four fragments from the region of the anterior nares, and showing the premaxillary and nasal bones. The principal fragment, 15 inches long, shows on the left side the sockets for 15 teeth. The sockets are as close as possible together without being confluent. Except in this character the remains correspond with Ichthyosaur in the form of the face, &c.

Case.	Shelf.	Specimen.
III	e	On this shelf are associated vertebræ of Plesiosaurus from Stanground near Peterborough. (Porter Collection.)
	e	1—26 are cervical vertebræ. e 1 is an inch and a quarter from side to side and less than an inch and a half long; e 26 is two and a half inches long. The intervertebral surface in all is quite flat, with a small central boss, except the first two or three, in which it is a little cupped. The body of the vertebra is compressed from side to side. The neural arch is anchylosed.
		27—29 pectoral vertebræ. The vertebræ are impressed at the sides, below the tubercle for the rib.
		30—41 dorsal vertebræ, with the rib on the neural arch. The last three are shorter and probably from near the sacral region.
		42—43 are large dorsal vertebræ, probably from a different specimen.
III	f	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> 1 right coracoid,  2 left coracoid,  3 right scapula,  4 undetermined, </div> <div style="font-size: 3em; margin-right: 10px;">}</div> <div> associated with the Plesio-  saur on e. </div> </div>
		5—9 small rounded single-headed ribs*.
		10—11 two slender lower jaws of a Crocodilian animal*.

## CABINET IV.

VI	a	1—17 unanchylosed atlas and axis and fifteen cervical vertebræ of a Pliosaurus from the Oxford Clay of Great Gransden. The wedge bone is anchylosed to the atlas. It is much larger than, and distinct from, Pliosaurus Evansi. Presented by L. Ewbank, Esq. It may be named <i>Pliosaurus pachydeirus</i> .
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\* The remainder of the Plesiosaurs and Crocodiles from the Oxford Clay are in Cabinet D in the Lecture-room.

# PLESIOSAURIA AND OTHER REPTILIA FROM THE LOWER OOLITES.

## GREAT OOLITE.

Cass.	Comp.	Drawer.	Specimen.	
J	b	2	1—2	teeth, probably of Plesiosaurs. Hampton Common.
			3—7	teeth of Plesiosaurus : Hampton Common Great Oolite.
			8	smooth tooth of an unknown animal. Hampton Common.
			9—10	small teeth, probably of Plesiosaurs. Hampton Common.
			11	distal end of first phalange of a Pterodactylian. Stonesfield.
			12	part of an elongated caudal vertebra collected in 1809 from Dorchester, 6 miles south of Oxford. Allied to Cetiosaurus.
			13—18	dorsal vertebræ of a rigid-backed Plesiosaurus, apparently P. Oxfordiensis (Phillips, MS.), from the top of the Cornbrash or base of the Oxford Clay near Olney.

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## PLESIOSAURIA AND CROCODYLIA

FROM THE LIAS.

Exhibited in Cabinet LXXXVII.

Case.	Shelf.	No.	
87	<i>a</i>	1	slab, including dorsal vertebræ and phalanges, &c., of Plesiosaurus.
	<i>a</i>	2	slab, including dorsal vertebræ and ribs of Plesiosaurus.
	<i>b</i>		vertebræ associated with the foregoing specimens.
	<i>b</i>	1—4	cervical vertebræ of Plesiosaurus.
	<i>b</i>	5—14	dorsal vertebræ of Plesiosaurus.
	<i>b</i>	15, 16	sacral vertebræ of Plesiosaurus.
<hr/>			
87	<i>c</i>	1	section through femur of Plesiosaurus, showing the conical proximal epiphysis and the sub-ovate distal epiphysis with their radiating nutritive vessels. The small girdle of the shaft is seen, and the section passes through the perforation for the artery.
	<i>c</i>	2	femur of Plesiosaur, narrow at distal end.
	<i>c</i>	3—4	cranium and early cervical vertebræ of a Plesiosaurus, from the Lias of Street. Presented by T. Hawkins, Esq. It is most nearly related to Pl. Hawkiusi (Owen).

Case.	Shelf.	No.	
87	d	1	crushed skull of <i>Plesiosaurus macropterus</i> (Seeley), belonging to the skeleton in the Lecture-room, Compartment A.
	d	2—3	cranial region of a large and undescribed Teleosaur, from the Lias of Whitby. It corresponds closely with the cerebral part of a <i>Plesiosaur</i> head. It has been sawn through to show the brain cavity, in which may be distinguished cerebral lobes, optic lobes, and cerebellum, also olfactory and optic nerves. It differs much from <i>Crocodyles</i> , and makes some approach to serpents and turtles, and probably differs but little from the brain of a <i>Plesiosaur</i> . Teleosaurs make so many approximations to <i>Plesiosaurs</i> , as to show that they form a group of <i>Crocodyles</i> of equal value with the <i>Crocodyles</i> now living.
<hr/>			
87	e	1	anchylosed atlas and axis of <i>Plesiosaurus megadeirus</i> , from the Kimeridge Clay of Ely, presented by Stead Jones, Esq.
	e	2	anchylosed atlas and axis of <i>Plesiosaurus megadeirus</i> , from the Kimeridge Clay near Haddenham, presented by the Rev. S. Banks, M.A. It is sawn in halves to show the union between the bones.
	e	3	separated atlas and axis of <i>Plesiosaurus eleutheraxion</i> (Seeley), from the skeleton in the Lecture-room. Presented by T. Hawkins, Esq. They were figured by Mr Lucas Barrett in the <i>Annals of Natural History</i> for November 1858.
	e	4	anchylosed atlas and axis of a small <i>Ichthyosaur</i> from the Lias, sawn through to show the union between the bones.
	e	5	anchylosed atlas and axis of a small <i>Ichthyosaur</i> from the Lias, of a different

Cas.	Shelf	No.	
87	e		species to the last, sawn through to show the imperfect union between the bones.
	e	6	basi-sphenoid of Ichthyosaurus from the Lias, worn; and sawn in halves to show the passage of the carotid artery through the bone.
	e	7	basi-occipital of Plesiosaurus, sawn through longitudinally; it shows uncertain indications of a distinct anterior part.
	e	8	basi-occipital of Plesiosaurus sawn in halves.
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87	f	1	longitudinal section through six dorsal vertebræ of Plesiosaurus, showing the epiphyses and the intervertebral spaces, from the Lias of ?Street.
	f	2	pectoral vertebra of Plesiosaurus, showing the broad tubercle for the rib, made partly by the neural arch, and partly by the centrum.
	f	3	longitudinal section through two Plesiosaur vertebræ*.
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	g	1—2	orbital region of the skull of a Teleosaur from the Lias, sawn through longitudinally. It displays frontal, prefrontal, nasal, lachrymal, maxillary and malar bones.
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	h	1	lower jaw of a small undescribed Teleosaur from the Lias of Whitby.
<hr/>			
	i	1	femur of a large Teleosaurus† from the Lias of Whitby.

\* The remainder of the Plesiosauria are in Compartment A in the Lecture-room.

† In the Lecture-room, in Compartment B, are the skull and lower jaw of a large Teleosaurus from the Lias of Whitby.

# ICHTHYOSAURIA

## FROM THE LIAS.

Remains illustrative of the Osteology of the genus in the Liassic æra.

Exhibited in Cabinet LXXXVIII.

Case.	Shelf.	Specimen.
88	<i>a</i>	1—2 mid-dorsal vertebræ; the cupped articulation subcircular in outline and 8 inches in diameter; back to front measures 3 inches. In Liassic Ichthyosaurs the tubercles for the rib are near to the anterior margin of the side, and the lower tubercle is more anterior than the upper one. In these specimens both are at the middle of the side, and, contrary to the usual arrangement, the upper tubercle is the larger. The pits for the neural arch are deep in front.
	<i>a</i>	3 early caudal vertebra with a single large tubercle for the rib at the lower third of the side. The intervertebral surface is flattened, of a broad ovate outline; narrow above, $5\frac{3}{4}$ inches high; two inches from front to back.
	<i>a</i>	4 32 associated terminal caudal vertebræ of a young Ichthyosaurus. These vertebræ are

Casa.	Shelf.	Specimen.	
88	<i>a</i>		unusually short from front to back, and should be contrasted with the corresponding vertebræ from the Cambridge Greensand.
	<i>a</i>	5	longitudinal section through 6 associated vertebræ of Ichthyosaurus [apparently mid-dorsal], showing the lozenge-shaped section of the intervertebral space. It also shows the section of the centrum like two cones opposed and meeting at their apices. The osseous structure is well seen.
	<i>a</i>	6	a small caudal vertebra, with sub-circular intervertebral articular side two inches in diameter.
	<i>a</i>	7	14 lower dorsal vertebræ (associated) of a small Ichthyosaurus from Whitby. In the last the two tubercles are blended into one oblique tubercle; this vertebra is usually considered pelvic or sacral. Both the ribs and neural arches are preserved. The latter exhibit the flattened neural spines adjacent superiorly, and the front and back zygapophyses looking obliquely upward and downward.
88	<i>b</i>	1	tooth of Ichthyosaurus platyodon. It is flattened from side to side so as to form sharp lateral ridges as in Dakosaurus, and as in that genus the crown of the tooth curves inward. There is a resemblance in the crown being nearly smooth. The fang is very long, massive, and quadrate; on each side it is vertically ridged, the ridges being continuations of those folds of the dentine which are seen in sections of the crown, and covered with enamel. The folds become rugose at the base, where the pulp-cavity is closed. The hemispherical excavation at

Case.	Shelf.	Specimen.
88	<i>b</i>	the middle of the basal part of the inner side of the fang may be regarded as absorbed by the pulp-cavity of the successional germ tooth, just forming.
	<i>b</i>	2 two teeth of the Ichthyosaurus platyodon type, crushed and associated with jaw-bones. Presented by Rev. W. Stokes.
	<i>b</i>	3 several smaller teeth of the Ichthyosaurus platyodon type, associated in a slab with jaw-bones.
	<i>b</i>	4 associated teeth of Ichthyosaurus in a slab. The crowns are curved inward, and the sharp subdividing ridges upon the crown are continuous with the ridges on the fang; and where the thin enamel is removed from the crown there is no distinction between crown and fang.
	<i>b</i>	5 jaws of a blunt-nosed Ichthyosaurus, teeth with slender quadrate fangs, cut and polished to display the folds in the tooth substance. The denser substance of the crown may also be observed.
	<i>b</i>	6 a very slender tooth of Ichthyosaurus, finely striated.
88	<i>c</i>	1 section through the jaws of a long-nosed Ichthyosaurus to show the arrangement of the bones of the face and mandible. <i>ps</i> the median bone is the pre-sphenoid somewhat V-shaped in section, concave above, convex below. <i>v</i> 13 on each side of the pre-sphenoid is the oblong section of the vomer, <i>m</i> 21 on each side of the vomer is the maxillary. The cavity on the under side of <i>m</i> 21 appears to be the groove for the teeth. These bones form the palate at the upper and outer side of the mouth in this region; <i>m</i> 21 gives

Cas. Shelf. Specimen.  
88 c

attachment to the flattened bone (*pm* 22), the premaxillary, which on its inner side is supported by a similar thin bone (*n* 15) on each side, which arch over above and meet in the mesial line; these bones are the nasals; they form three sides of the quadrate empty space in the skull, of which the base is made by the palatal bones.

The four bones on each side below are a section of the lower jaws.

c 2 the ends of this section of jaws are polished.

The proximal end is cut off from  $\frac{c1}{88}$ . In

the smaller end the pre-sphænid is seen to have disappeared; the vomera being adjacent and sub-ovate. The pre-maxillaries attain a greater development and appear to take the place of the maxillaries. The teeth may be seen in the alveolar groove. In the lower jaw three bones on each side form the mandible.

c 3 section of jaws, chiefly valuable as showing sections of teeth *in situ*.

c 4 more distal part of the jaws *c* 1 and *c* 2, polished at the anterior end, in which the vomera and nasal bones are not prolonged, and the jaw is formed by the premaxillary bones.

c 5 anterior terminal part of the same jaws.

88 c 1 cranial region of skull of Ichthyosaurus from Barrow-upon-Soar, displaying on the palatal surface the basi-sphænid and connate pre-sphænid style. On the right is seen the pterygoid narrowing and emarginate externally as it passes behind the basi-sphænid, after which it again appears to expand and become the outer inferior wall of the tem-

Case.	Shelf.	Specimen.
88	c	

poral foss. Where the pterygoid is fractured in front it is seen to be underlain by a lamellar bone which extends inward to the pre-sphenoid, and extends outward and forms the bony floor to the orbit. This bone externally meets the malar behind and corresponds with the maxillary in turtles and most reptiles. The malar appears to be style-like, bent so as to curve upward behind the orbit, where it is met above by the crescentic post-orbital bone, which makes the back of the orbit, reaching up to the squamosal, which forms the outer border of the temporal foss; below the squamosal and posterior to the post-orbital is a squamous bone imperfectly preserved, the super-temporal of Owen, sometimes called supra-quadrate.

On the superior surface is seen the frontal in front, giving off the post-frontals on each side. And posteriorly it will be noticed that the bones have been removed from the mesial region so as to expose part of the internal cast of the brain cavity, which is partly cut away behind. Supposing the brain to have filled the whole cavity, the cerebral lobes were large, high in front, and convex.

In the orbital cavities are the remains of the eyes, large sub-hemispherical organs defended with numerous thin plates of bone, which overlap each other, and in front leave an uncovered central part half the diameter of the eye. The eyes are vertical and look outward and forward.

The lower jaw is *in situ*; and the form of the articular bone, which is partly exposed behind, is worth examination, being characteristic of all Ichthyosaurs.



Casa.	Shelf.	Specimen.	
88	<i>d</i>	2	crushed head of a short-nosed Ichthyosaur, displaying well the composite structure of the lower jaw, and showing the nasal bones to come far forward between the premaxillaries. The cranial region is obscured with what appear to be the bones of a paddle.
	<i>d</i>	3	a section through the anterior part of the snout of an Ichthyosaurus just before the disappearance anteriorly of the nasal bones. There is also a section of the dentary bones. The species is reputed to be <i>I. tenuirostris</i> .
	<i>d</i>	4	anterior part of the upper jaw of a very small Ichthyosaurus polished in front and behind; showing in front the premaxillary and termination of the nasals, and behind the premaxillaries, nasals, vomera, and indications of other bones displaced. The teeth are large and minutely striate.
	<i>d</i>	5	section through the premaxillary and dentary bones of an Ichthyosaurus with teeth <i>in situ</i> , from Lyme Regis.
	<i>d</i>	6	fragment of premaxillary bone with numerous slender teeth closely packed in the alveolar groove, from Lyme Regis.
88	<i>e</i>	1	portion of the jaws of an Ichthyosaurus crushed, fractured in front and behind. On the left-hand side, where the premaxillary is broken away, the nasal bone is seen under it; and behind where the nasal bone is broken away, it is seen to overlap the frontal. On the right side the teeth with short crowns are well seen.

Cass.	Shelf.	Specimen.
88	e	2 a similar but smaller jaw with more slender teeth. It shows the maxillary and the nasal bones behind. From Tewkesbury near Gloucester.
	e	3 anterior part of the upper jaw of a short-nosed Ichthyosaurus with thin alveolar border and teeth <i>in situ</i> , conical and apparently smooth. The palate is flattened and covered with vascular perforations. From Weston near Bath.
	e	4 anterior part of the snout of a long-nosed Ichthyosaurus, a little compressed, reaching back to show the maxillary bone on the right side, but the nasal bones do not come so far forward. The supra-alveolar and infra-alveolar grooves in this species are broken up into a number of elongated foramina. From near Lichfield.
88	f	1 the eye, 3 inches in diameter, of an Ichthyosaurus from Whitby. The sclerotic plates which defend the eye are thin. They appear to consist of two series, one around the circumference, and a more elongated series which defends the front of the eye, and overlaps these behind. From this junction radiating impressed lines descend towards the undefended central part of the eye. Several of the front plates have come away, and show casts of their under sides.
	f	2 a compressed left humerus, showing the outer side.
	f	3 femur, probably left. The ends are vascular, and the flattened proximal end unlike the rounded condyloid end of specimens in the Cambridge Greensand.
	f	4 a crushed specimen of a small humerus from

Case.	Shelf.	Specimen.
		Whitby; it is apparently left, and shows the under side. It is remarkably expanded at the distal end.
88	<i>f</i>	5—6 right and left humerus of a small Ichthyosaurus from Whitby. They differ more from the specimens in the Cambridge Greensand than these differ among themselves; but conform in all the characteristic structures of the bone.
	<i>f</i>	7 cast of the basi-sphenoid bone of Ichthyosaurus; the original in the collection of Mr Wetherell. Presented by Mr Charlesworth.
	<i>f</i>	8 left coracoid of Ichthyosaurus, slightly crushed at the humeral end, but showing the emarginate and extended posterior border entire. Anteriorly it is a little broken, but never had the deep anterior post-scapula emargination near the humeral end which characterizes some species.
88	<i>g</i>	1 the pick-axe or T-shaped bone of the pectoral girdle of Ichthyosaurus, called the inter-clavicle by Mr Parker, and episternum of authors. The long haft-like part is compressed so as to be expanded from side to side; it overlaps externally the median union of the coracoid bones. The cross-piece corresponding to the iron of the pick-axe is much thickened and narrow from side to side; this cross-piece is superimposed externally on the clavicle. Between the clavicle and the coracoids are the scapulæ so that the [episternum or] inter-clavicle is a cross bracing bone which holds the pectoral girdle together.
	<i>g</i>	2 a large and instructive coprolite. It has a few coils like a univalve shell, and shows a number of fish scales, &c. on the surface of the

Case.	Shelf.	Specimen.
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- |    |          |   |
|----|----------|---|
|    |          | hardened phosphate of lime of which it is formed.   |
| 88 | <i>g</i> | <p>3 a large and instructive coprolite from Lyme Regis. The first extruded part is conical like a rifle-bullet, a form due to a powerful anal sphincter muscle, and suggestive of a rectum separated by some distance from the arrangement which gave the coprolite its spiral form; for it will be seen that the first formed coils are partly obliterated and their direction apparently partly reversed by the passage down the rectum. For four inches the coprolite continues to widen, and shows the spiral well preserved, when it suddenly becomes a loose and unconsolidated wide-spread evacuation of undigested scales of ganoid fishes, half formed coprolite, fragments of shells and (?) spines of sea-urchins. These coprolites have been referred to Ichthyosaurus, but there is no evidence in the Woodwardian Museum to substantiate this view, which gained currency, probably, from the supposition that Ichthyosaurs were low reptiles which had strong affinity with fishes. And even were these coprolites indubitably Ichthyosaurian, they differ materially from those of sharks and rays in the fewness of the coils, which in the sting-ray are produced by a valve with 22 coils, and in sharks by a valve with usually 9 or 10 coils, while in the largest coprolites there are commonly three or four coils, so it is equally possible that they may be the result of the direction in which the intestine opens into the enlarged rectum, and the coprolite be no more indicative of piscine than of mammalian affinities.</p> |

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<i>h</i>	1	coprolite from Lyme Regis with scales of <i>Dapedium</i> .
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Case.	Shelf.	Specimen.	
88	<i>h</i>	2—8	various coprolites.
	<i>h</i>	9—17	coprolites cut and polished to display included scales &c. and the spiral coil.
	<i>h</i>	18	cast of a coprolite from the Lias of Lyme Regis.
<hr/>			
	<i>i</i>	1	cast of a large basi-occipital bone of Ichthyosaurus from the Lias.
	<i>i</i>	2	cast of a corresponding basi-sphenoid bone.
	<i>i</i>	3	cast of quadrate bone.
	<i>i</i>	4	cast of ? ex-occipital.
	<i>i</i>	5	cast of supra-occipital.

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On the same shelf is temporarily placed a cast of the vertebræ found in the coal measures of South Joggins, Nova-Scotia, called the *Eosaurus Acadianus*. Presented by Prof. O. C. Marsh.

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## PLESIOSAURIA AND OTHER REPTILES

FROM THE TRIAS OF GERMANY.

Exhibited in the Wall Cases XI. and XII.

Case.	Shelf.	No.	
XI			These Foreign Reptiles are chiefly Count Münster's duplicates: such specimens commonly have a label giving his determination, and correspond with the types at Munich.
XI	a	1—15	ribs of Nothosaurus. a. 5 is fragment of rib of <i>N. giganteus</i> from Muschelkalk of Laineck near Bayreuth. a. 9 is probably the anterior dorsal rib of a <i>Pterodactyle</i> . a. 10 is a median sternal rib. The others are all single headed, and flattened.
XI	b	1—24	vertebræ and neural arches of Nothosaurus. b. 5 has the neural arch entire; it is a pectoral vertebra of <i>N. mirabilis</i> from the Muschelkalk of Laineck near Bayreuth. b. 7 a dorsal vertebra of the same species. b. 13 an example of the massive neural arch of a Nothosaur. b. 18 caudal vertebra of <i>N. Munsteri</i> . b. 19—21 ? early caudal vertebræ.
XI	c	1—5	casts of skulls of Nothosaurs. c. 1 cast of skull and lower jaw of Nothe-

Case.	Shelf.	No.	
XI	c		<p>saurus mirabilis; the outlines of some of the bones have been marked in ink.</p> <p>c. 2 lower jaw of same species. The first six teeth on each side are large, behind these the jaw contracts, and the teeth are small and uniform.</p> <p>c. 3 cast of skull of same species showing palate. With the exception of three large canine-like sockets on each side, the teeth appear to be double as in the recent <i>Hatteria</i> or <i>Sphenodon</i>.</p> <p>c. 4 anterior part of skull showing anterior nares, and parts of orbits, the nasal bones, and parts of premaxillary, maxillary, and pre-frontal.</p> <p>c. 5 cast of part of skull of <i>Nothosaurus venustus</i> (Münster), from Querfurth, Thüringia.</p>
XI	d	1—14	<p>teeth, chiefly of <i>Nothosaurus</i> from the Muschelkalk of Laineck near Bayreuth.</p> <p>1 <i>Dracosaurus Hoffmanni</i> (Münster).</p> <p>2 <i>Dracosaurus giganteus</i> (Münster).</p> <p>14 <i>Dracosaurus Bronnii</i> (Münster).</p> <p>4—5 } <i>Nothosaurus mirabilis</i> (Münster).</p> <p>9—11 }</p> <p>6, 7 <i>Nothosaurus Andriani</i> (H. v. Meyer).</p> <p>8 <i>Nothosaurus giganteus</i> (H. v. Meyer).</p> <p>13 <i>Nothosaurus venustus</i> (Münster).</p>
XI	e	1—5	<p>femora &amp;c. of <i>Nothosaurus</i>.</p> <p>1 cast of a larger and perfect femur of <i>N. giganteus</i> (von Meyer); it is intermediate between <i>Plesiosaurus</i>, <i>Chelone</i> and <i>Ichthyosaurus</i>.</p> <p>2 fragment of a long bone, probably femur, showing the elongated conical epiphysis as in <i>Plesiosaurus</i>.</p> <p>3—4 proximal ends of femora.</p>

Cass.	Shelf.	No.	
XI	<i>f</i>	1—7	humerus of Nothosaurus.
		1—3	proximal ends of humerus.
		4, 5, 7	entire humerus.
		6	cast of a large humerus. <i>N. mirabilis</i> . the affinities of the humerus are with Che- lonians, Plesiosaurs and Ichthyosaurs.
<hr/>			
XI	<i>g</i>	1—9	1—2 and 4 are regarded as pelvic bones; they present many characters which might be expected in the coracoid, the others are smaller bones of the limb and ribs.
<hr/>			
XI	<i>h</i>	1—7	fragments of pelvic bones and of smaller bones of the limb.
<hr/>			
XI	<i>i</i>	1—2, 6, 7	Pistosaurus.
	<i>i</i>	3	cast of skull of <i>Conchiosaurus clavatus</i> (von Meyer).
	<i>i</i>	4, 5	<i>Charitosaurus Tschudii</i> (von Meyer).
Under Shelf <i>i</i> are some remains of <i>Mystriosaurus</i> .			

## CABINET XII.

XII	<i>a</i>	1—20	teeth of <i>Placodus</i> , referred to the species <i>P. Andriani</i> , <i>P. gigas</i> , <i>P. rostratus</i> , <i>P.</i> <i>impressus</i> , and <i>P. Munsteri</i> .
<hr/>			
XII	<i>b</i>	1—24	36 teeth of <i>Placodus</i> referred to the species <i>P. gigas</i> , <i>P. Andriani</i> , and <i>P. Munsteri</i> .
<hr/>			
XII	<i>c</i>	1	cast of left ramus of lower jaw of <i>Placodus</i> <i>gigas</i> (Ag.).
		2	left ramus of lower jaw of <i>Placodus gigas</i> with three teeth.
		3	cast of skull of <i>Placodus Munsteri</i> (Ag.).
		4	cast of skull of <i>Placodus gigas</i> (Ag.).
		5	three associated teeth of <i>Placodus gigas</i> .



Case.	Shelf.	No.	
XII	c	6	four associated maxillary teeth of <i>Placodus gigas</i> .
		7	two associated teeth of <i>Placodus Andriani</i> .

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## FOSSILS FROM THE ALEXANDER RIVER, SOUTH AFRICA.

XII	d	1	cast of skull of <i>Dicynodon lacerticeps</i> (Owen).
		2	cast of skull of <i>Dicynodon testudiceps</i> (Owen).
		3	cast of skull of <i>Dicynodon strigiceps</i> (Owen).
		4	cast of skull of <i>Rhynchosaurus articeps</i> (Owen), from Grinsill, Shrewsbury.
		5	fragment of a bone from Sandstone of Coton end near Warwick.

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On shelves *e, f, g, h* of Case XII. are placed  
11 large foot-prints, from the Connecticut  
Sandstone.

Over Cabinet XII. are foot-prints from the New Red Sandstone.

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On the left side of the entrance, under glass, is the cranium of  
*Dicynodon Murrayi* (Huxley), presented by Prof. Huxley.

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REPTILE REMAINS ARRANGED ROUND THE WALLS  
IN THE EAST ROOM (OR LECTURE-ROOM).

Compartment A.

PLESIOSAURUS.

Comp.	No.	
<b>A</b>	1	<i>Plesiosaurus macropterus</i> (Seeley). Lias. Whitby, skeleton.
	2	<i>Plesiosaurus eleutheraxion</i> (Seeley). Lias. Street. Greater part of skeleton. Presented by T. Hawkins, Esq.
	3	<i>Plesiosaurus cliduchus</i> (Seeley). Lias. Street. Dorsal part of skeleton, with episternum and scapula. Presented by T. Hawkins, Esq.
	4	<i>Plesiosaurus</i> sp. Lias. Dorsal and pectoral part of skeleton.
	5	? fore limb of <i>Plesiosaurus</i> . Lias.
	6	<i>Plesiosaurus</i> , Lias. Two femora and a humerus.

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Cast of the fore paddle of *Pliosaurus brachydeirus*, from the Kimeridge Clay of Dorsetshire.

56 vertebræ of a *Plesiosaur* from the Kimeridge Clay of Ely; 42 are cervical. Presented by Stead Jones, Esq. They are mounted on a stand.

There are also arranged on the East side of the Compartment five slabs showing foot-prints of various reptiles, of a crustacean, and rain-prints and sun-cracks from the New Red Sandstone of Cheshire.

**B** In Compartment B are two slabs of foot-prints from the New Red Sandstone. The skull and lower jaw of a *Teleosaurus* from the Lias of Whitby. And the skull (No. 16) of a large *Ichthyosaurus*.

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## REMAINS OF ICHTHYOSAURUS FROM THE LIAS.

## Exhibited in Compartments B, C, and F.

Comp.	No.			
<b>C</b>	1	skeleton of Ichthyosaurus.	Street.	Presented by T. Hawkins, Esq.
	2	skeleton of Ichthyosaurus.	Street.	Presented by T. Hawkins, Esq.
	3	skeleton of Ichthyosaurus.	Street.	Presented by T. Hawkins, Esq.
	4	skeleton of Ichthyosaurus.	Lyme Regis.	Presented by Prof. Sedgwick.
	5	skeleton of Ichthyosaurus.		
	6	skeleton of Ichthyosaurus.	Street.	Presented by T. Hawkins, Esq.
	7	skeleton of Ichthyosaurus.		
	8	skeleton of Ichthyosaurus.	Lyme Regis.	Presented by Prof. Sedgwick.
	9	skeleton of Ichthyosaurus.		
	10	scattered skeleton of Ichthyosaurus.	Street.	Presented by T. Hawkins, Esq.
	11	skeleton of Ichthyosaurus.	Barrow.	Presented by H. Packe, Esq.
	12	scattered skeleton of Ichthyosaurus.	Street.	Presented by T. Hawkins, Esq.
	13	remains of two skeletons of Ichthyosaurus.	Street.	Presented by T. Hawkins, Esq.
	14	skull of Ichthyosaurus.		
	15	skull of Ichthyosaurus.		Presented by Earl Zetland.
<b>B</b>	16	skull of Ichthyosaurus.		
<b>C</b>	17	skull and cervical vertebræ of Ichthyosaurus.		
	18	vertebræ, basi-occipital, and other remains of an Ichthyosaurus.		

On the South side of the Room, in Compartment F, are

<b>F</b>	19	skeleton of Ichthyosaurus.	Street.	Presented by T. Hawkins, Esq.
	20	skeleton of Ichthyosaurus.	Street.	Presented by T. Hawkins, Esq.

Comp. No.

- F** 21 part of skull of Ichthyosaurus. Street. Presented by  
T. Hawkins, Esq.
- 22 part of skull of Ichthyosaurus. Street. Presented by  
T. Hawkins, Esq.

## FOSSILS FROM THE OXFORD CLAY OF PETERBOROUGH.

Exhibited in Cabinet **D** in the Lecture-room.

Remains of a new species of Plesiosaurus (Porter Collection).

## PLESIOSAURUS PHILARCHUS.

- | Shelf. | No.    |  |
|--------|--------|--|
| 1      | 1      | lower jaw $29\frac{1}{2}$ inches long, with sockets for 38 teeth on each side and some teeth <i>in situ</i> . The teeth rapidly decrease in size, and the hindermost are very small. Symphysis $9\frac{1}{2}$ inches long.                         |
|        | 2      | portion of anterior termination of head a foot long, exhibiting sockets for 14 teeth on one side. The first five are in the pre-maxillary bones, the fifth and sixth are small.  |
|        | 3, 4   | right and left humeri. The humerus is $14\frac{1}{2}$ inches long, thick at the proximal end, thin and broad at the distal end, like Pliosaurus.   |
|        | 5      | scapula; it sends a strong process outward and backward.   |
|        | 6—9    | undetermined fragments, probably pubic bones.  |
|        | 10, 11 | right ischium and left ischium.  |
|        | 12—13  | right and left femora. The femur is 17 inches long, very strong, with a large head. On the middle of the posterior border it gives off a small trochanteroid process, which may be compared with the middle trochanter on the femur of a Dinosaur. |
| 2      |        | 29 bones of the carpus, tarsus, and fore-arm, &c.  |
|        |        | 60 phalanges.  |
| 3      |        | vertebral column.  |
|        | 1      | anchylosed atlas and axis.   |
|        | 2—17   | cervical vertebræ, very slightly cupped, with short straight cervical ribs, expanding a little from side to side at the terminal end. The early vertebræ   |

Cas. Shelf.  
D 3

No.

send downward, from the middle of the anterior edge of the cup on the ventral margin, a small process which impresses the next vertebra and suggests the intervertebral ossicle of some lizards.

- 18—23 pectoral vertebræ.  
24—45 dorsal vertebræ.  
46—48 sacral vertebræ.  
49—63 caudal vertebræ.

? STENEOSAURUS FROM PETERBOROUGH (Porter Collection).

- 2 specimen mounted in Roman cement.

Fore part of mandible, showing symphysis 17 inches long; in that distance are 27 teeth. The teeth are round in section, curved, and closely striated. Most of the bones of the head are imbedded so as to show the palatal surface. Also four cervical vertebræ.

Remains of a new Steneosaur (Porter Collection).

STENEOSAURUS DASYCEPHALUS.

- 4 the greater part of the skull anterior to the parietal bones. The surface is rough and wrinkled.  
basi-occipital bone.  
anchylosed atlas and axis.  
3 cervical vertebræ.  
12 dorsal vertebræ.  
3 sacral vertebræ.  
20 caudal vertebræ.  
right and left femora.

FOSSILS FROM THE KIMERIDGE CLAY.

On this Shelf are temporarily placed fossils from the Kimeridge Clay, and from the Chalk.

- 5 os pubis,  
femur,  
tibia,  
3 tarsal bones,  
12 phalanges, } of a Plesiosaur from the Kimeridge Clay of Ely.

Case. Shelf.

**D** 5

6 associated cervical vertebræ of a Plesiosaur.

2 cervical vertebræ of a Plesiosaur.

15 phalanges of a Plesiosaur.

ulna of Pliosaurus from Cottenham. Presented by  
Rev. S. Banks.

carpal or tarsal bones of Pliosaurus from Cottenham.  
Presented by Rev. S. Banks.

humerus, ulna, 3 carpal bones, and 12 phalanges of  
a Plesiosaur from Oxford or Kimeridge Clay.

2 lower dorsal vertebræ of an Ichthyosaurus from  
Ely.

coracoid of small Ichthyosaurus.

jaw, portions of ribs of Ichthyosaurus, from Cotten-  
ham. Presented by R. M. Prior, Esq.

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FOSSILS FROM THE CHALK.

Two specimens of the fore part of the skull of Ichthyosaurus,  
showing upper and lower jaws, one with the jaws in juxta-  
position, and extending from the tip of the snout to near the  
orbit.

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## CHIEFLY CASTS OF FOSSILS,

Exhibited on the Shelves of Cabinet E.

## FOSSILS FROM THE SOLENHOFEN SLATE.

Shelf.	No.	
3	1	cast of <i>Pterodactylus Suevicus</i> (Quenst.)
	2—3	cast of <i>Pterodactylus rhamphastinus</i> (Wagn.), both slabs.
	4	cast of head of <i>Pterodactylus Munsteri</i> (Goldf.).
	5	cast of <i>Pterodactylus medius</i> (Munster.)
	6—7	cast of <i>Rhamphorhynchus longicauda</i> (Meyer.), both slabs.
	8	cast of <i>Rhamphorhynchus longimanus</i> (Wagn.).
6	9	cast of <i>Euristernon Wagleri</i> (Münster).
3	10	cast of <i>Pleurosaurus Goldfussi</i> (von Meyer.).
	11	cast of <i>Gnathosaurus subulatus</i> (von Meyer).
<hr/>		
	12	cast of <i>Chelonemys ovata</i> from Cirin.

## FOSSILS FROM THE LIAS.

5	cast of skull and cervical vertebræ of <i>Plesiosaurus</i> .
	cast of skull, and a cast of the fore limb of the same animal, <i>Plesiosaurus megacephalus</i> (Stutchb).
	two casts of the lower jaw of a <i>Plesiosaur</i> .
	part of the vertebral column (split through), and ribs of <i>Ichthyosaurus</i> .
4	pectoral part of an <i>Ichthyosaurus</i> from Tewkesbury.
5	two casts of skull of <i>Ichthyosaurus communis</i> .

## FOSSILS FROM THE TRIAS.

1	cast of skull of <i>Phytosaurus Kaupffii</i> . Stuttgardt.
	cast of lower jaw of <i>Phytosaurus Kaupffii</i> .

## REPTILES IN THE LOWER ROOM.

## North side. Compartment 2.

Cast of *Plesiosaurus dolichodeirus* (Conyb.).

Cast of fore paddle of a *Plesiosaur* from the Oxford Clay near Bedford.

## South side.

Cast of *Plesiosaurus Hawkini* (Owen).

Cast of *Pleiosaurus macrocephalus* (Owen).

## Compartment 6.

*PLESIOSAURUS MACRODEIRUS.*

Remains of a *Plesiosaur* from the Kimeridge Clay of Wichford near Haddenham. Presented by Rev. S. Banks. There are about 42 cervical vertebræ, 18 dorsal and 31 caudal, with numerous ribs.

## Compartment 7.

A short-nosed *Ichthyosaurus* with the ischium and pubis ankylosed, from the Lias.

Cast of a small *Ichthyosaurus* from the Lias.

A slab of stone with scattered *Ichthyosaur* vertebræ and ribs, also a smaller slab with similar remains.

A slab of stone with scattered vertebræ of *Plesiosaurus*.

Two slabs of stone imbedding connected *Plesiosaur* vertebræ; and sundry less important isolated vertebræ and fragments of coracoid bones.

## Compartment 9.

Parts of facial bones of a *Pliosaur* from the Kimeridge Clay.

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